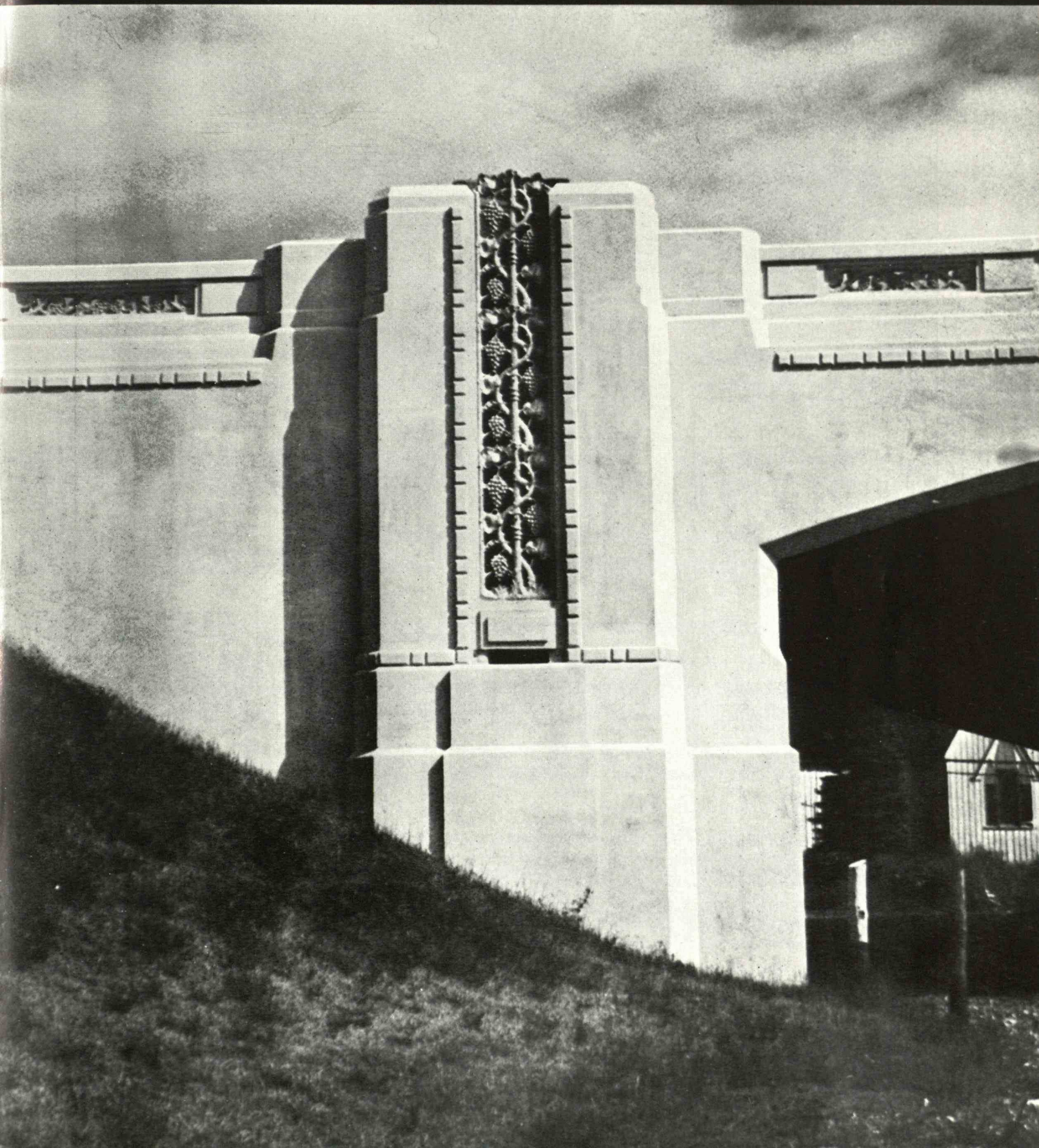


May 1944

TECHNOLOGY

REVIEW

Title Reg. in U. S. Pat. Office



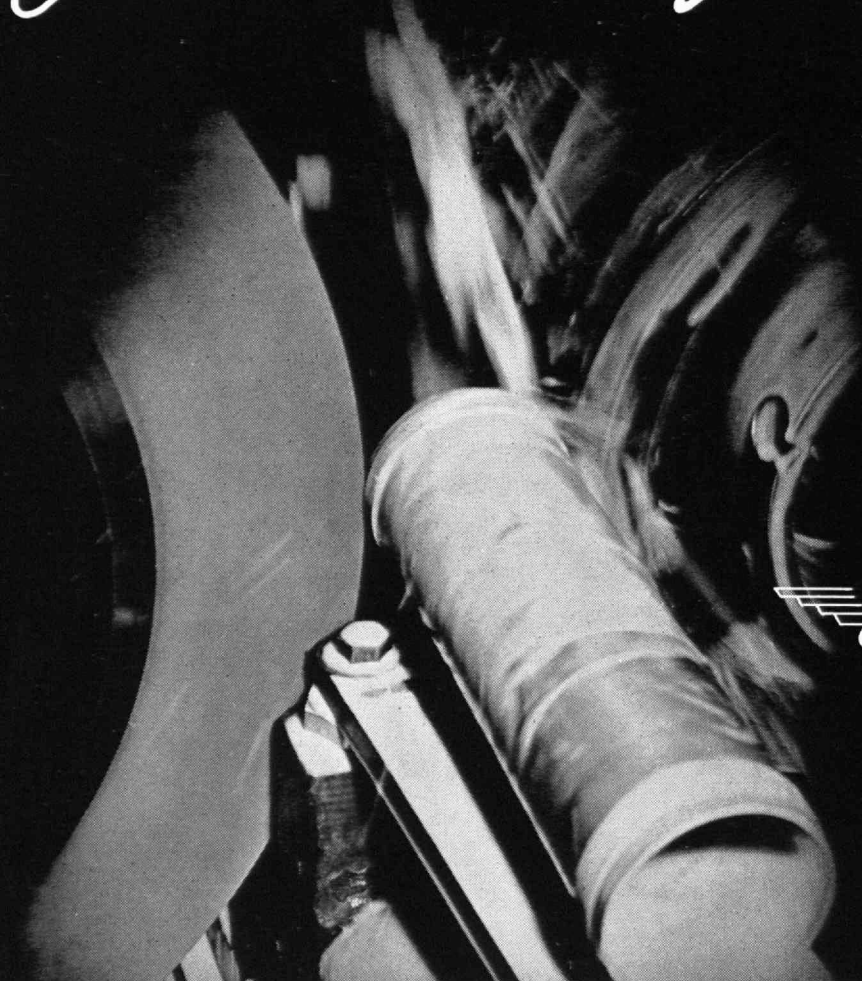
technology review

Published by MIT

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NEW ABRASIVE

a "Gift" to Centerless Grinding—



AIRCRAFT
NORTON
GRINDING

Grinding jobs like this thin-wall cylinder of heat-sensitive steel are critical operations. In aircraft production tolerance limits are measured in tenths of thousandths and the steel itself must not be injured. The selection of the grinding wheel is an important matter—the selection of the abrasive and the grain size, grade, and structure.

A new abrasive recently announced has proved near perfect for grinding wheels employed in centerless grinding in the production of airplane parts because of its cool-cutting properties. It is known as 57 Alundum. It has met with so much success since its introduction in war industries, particularly aircraft, that the entire production has been frozen for this important work. Now, enlarged facilities have made 57 Alundum available for any plant that can use it. This is an important announcement, and you should not let it pass unnoticed.

NORTON COMPANY, Worcester 6, Mass.

Photo courtesy North American Aviation, Inc.

Behr-Manning, Troy, N. Y., is a Norton Division

NORTON ABRASIVES



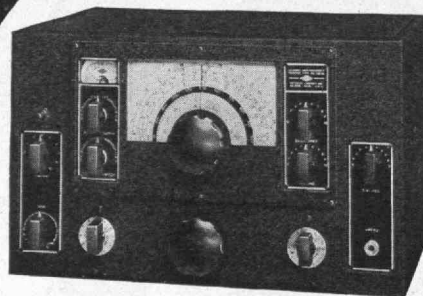
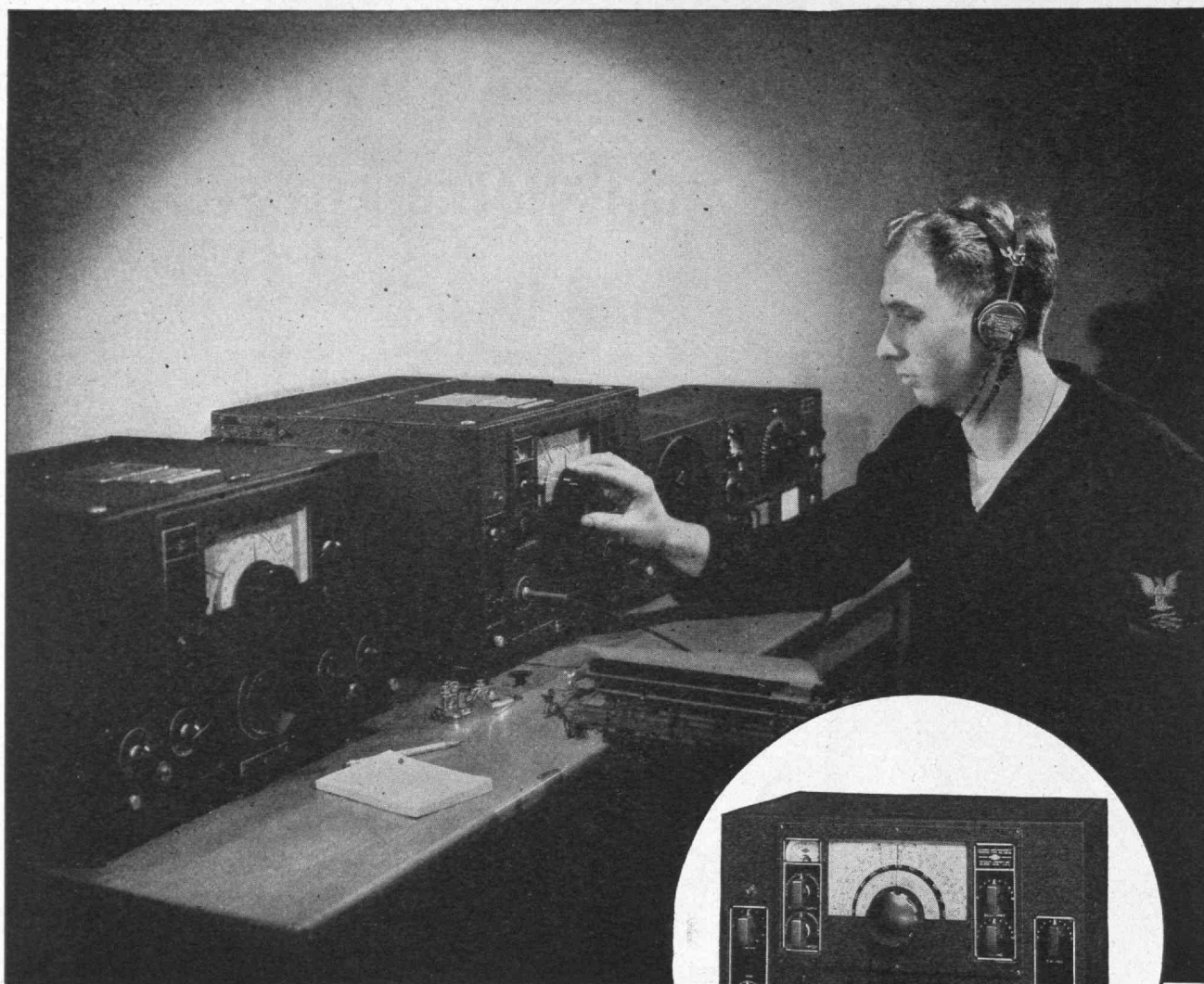
...Are you protecting Your Skilled Workers' EYES?

Many tool makers . . . die makers . . . master mechanics . . . expert lathe operators and other much-needed skilled workers could be helping the war effort and their former employers right now *if* it hadn't been for eye accidents—which could have easily been avoided.

There is an indisputable moral in this condition for those companies that have not yet lost key workers, even though failing to provide them with goggles: *don't continue to take chances with the law of averages —install an employee-protecting, money-saving goggle program NOW!*

American Optical Company offers you an entire line of comfortable goggles, each scientifically designed to meet specific types of eye hazards. Get in touch with your nearest AO Branch Office . . . or have an AO Safety Representative call.


American Optical
 COMPANY
 SOUTHBRIDGE, MASSACHUSETTS

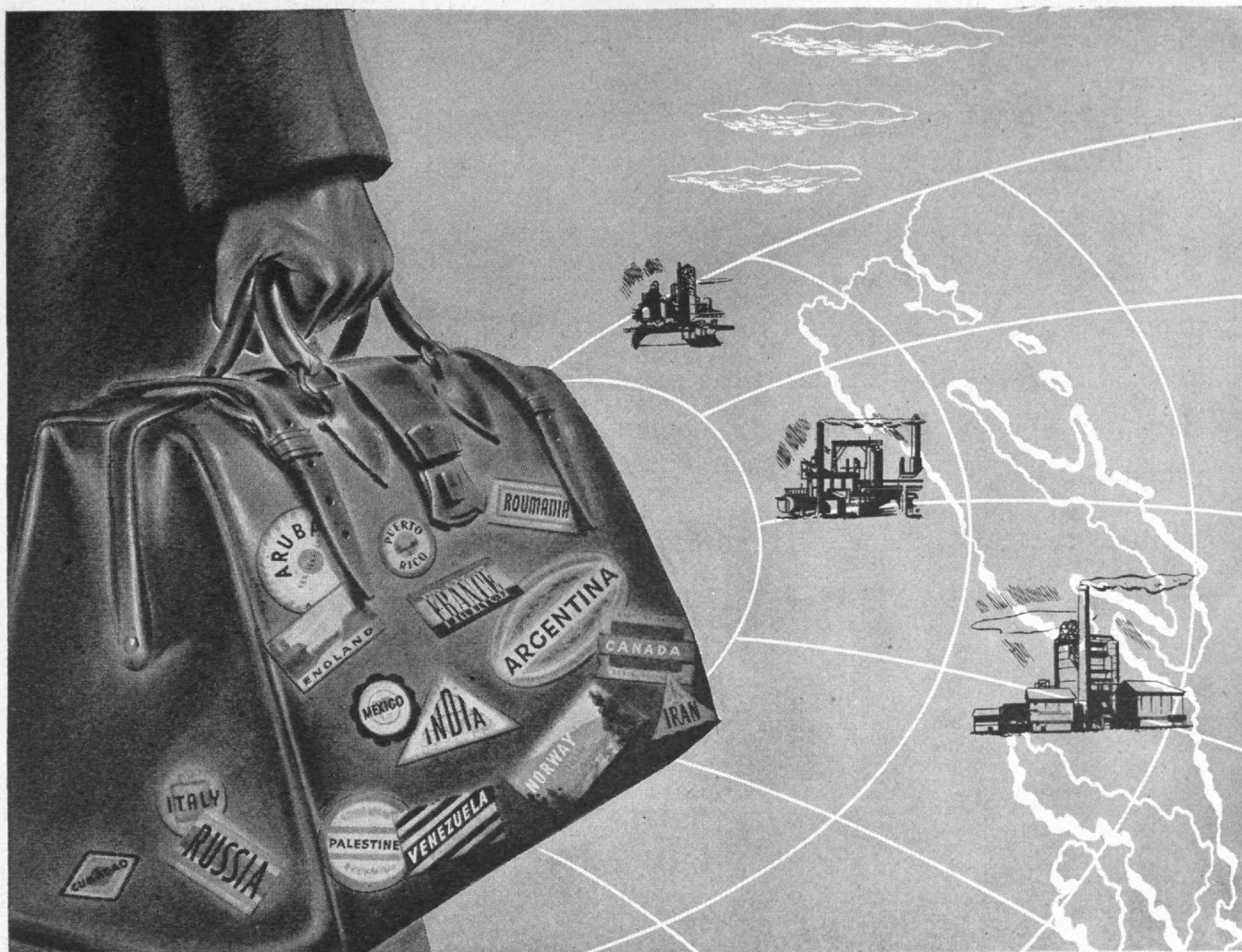


NC-100XA

The NC-100XA has gone to war. Under the pressure of the emergency following Pearl Harbor, many stock receivers of the NC-100 series went into action, and served brilliantly. Since then growing experience had led to a long series of minor changes and improvements, culminating in the superb receiver shown in the photograph above. We cannot show what is inside the cabinet until after the war, but a glance at the front panel will make any amateur recognize an old friend. It is stripped for action and in battle dress, but it is still the old reliable NC-100XA. And like its amateur prototype, this new Navy model is winning an impressive reputation for brilliant performance and absolute reliability.



NATIONAL COMPANY, INC., MALDEN, MASS.



WE'VE BEEN PLACES AND DONE THINGS

Process engineering, plant construction, equipment manufacture . . . Badger's experience in these phases of the chemical, petro-chemical and petroleum refining industries covers not only many years—but *many scenes of operations throughout the world.*

These world-wide activities have broadened Badger's "know-how" well beyond that which is normally acquirable from domestic projects alone. Regions where only salt water is readily available—climates that reach 60° below

or 110° above—terrains subject to earthquakes or sand-storms and drought—locations inaccessible by normal means . . . these and similar perplexing problems have had to be—and were—solved by Badger planning boards, design engineers, procurement specialists, transportation experts, erecting engineers, labor co-ordinators, and other key personnel.

Badger's foreign assignments include both war and pre-war projects. The knowledge gained therefrom is of

special value to those looking to post-war expansions—either at home or abroad. It carries every assurance that any processing method, plant design, or form of construction recommended by Badger is the best that modern engineering can provide.

The Badger organization is prepared to consider further contracts embracing chemical, petro-chemical or petroleum refining plants anywhere in the world—whether involving new construction, conversion, or modernization.

E. B. Badger & SONS CO., BOSTON—EST. 1841

NEW YORK • PHILADELPHIA • SAN FRANCISCO • LONDON

PROCESS ENGINEERS AND CONSTRUCTORS FOR THE CHEMICAL, PETRO-CHEMICAL AND PETROLEUM INDUSTRIES

(399)

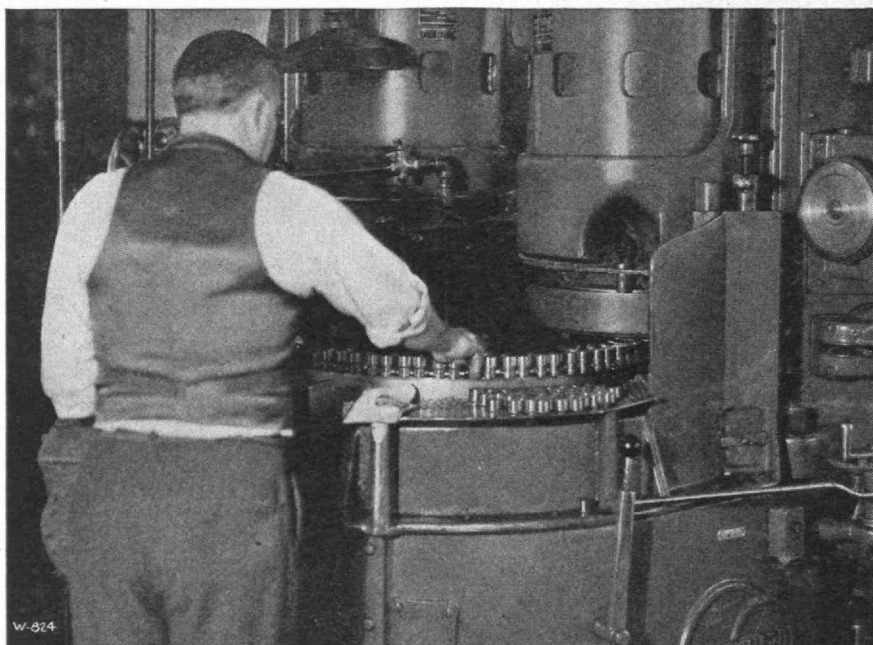
"PUT IT ON THE BLANCHARD"

These heat treated steel trunnion bearings are ground on a No. 16-A2 Blanchard Surface Grinder.

They are loaded on special 80-station fixture with magnetic studs locating from previously ground surface. The end of the bearing is then ground to very close limits. At the unloading station the work is automatically ejected and demagnetized.

.005" to .015" of stock is removed, to limits of $\pm .0005$ ". 18,500 pieces are produced per 8 hour shift.

Grinding Trunnion Bearings on No. 16-A2
Blanchard Surface Grinder.



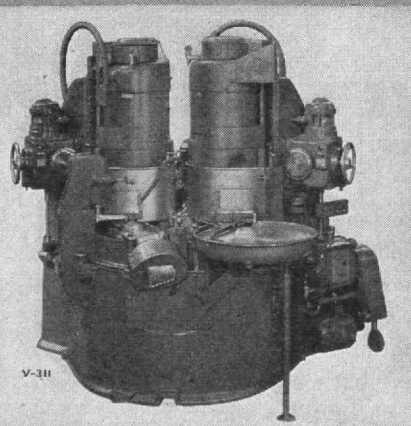
The **BLANCHARD**
MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

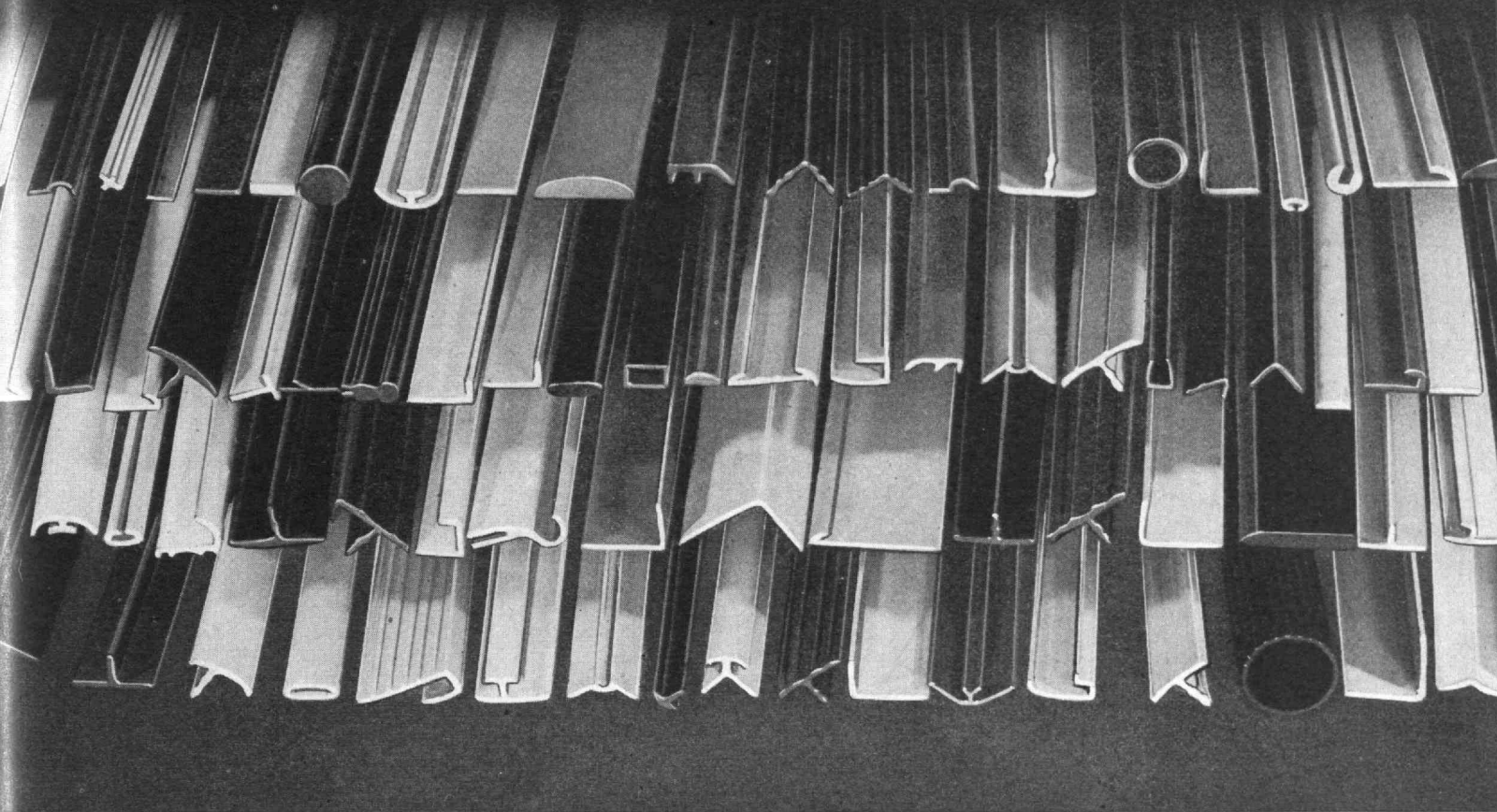
CHECK THESE ADVANTAGES OF BLANCHARD GRINDING

- ★ **Production**
- Adaptability**
- Fixture Saving**
- Operation Saving**
- Material Saving**
- ★ **Fine Finish**
- ★ **Flatness**
- ★ **Close Limits**



★
..... Especially
valuable on jobs like
the one illustrated.





RIGID

custom Plastic Sections are extruded by SANDEE in great variety. Regardless of shape, or quantity desired, Sandee Extrusion Service offers correct materials; uniform high quality; close tolerances; and strict adherence to the most exacting specifications!

Here, highly skilled plastic engineers with methods and machinery of our own design, assure a successful finished product. If you have a problem in which Extruded Plastics are involved, submit it to us today, without obligation. We will gladly send samples, ideas, suggestions, and cost estimates. Sandee is one of America's largest extruders of plastic products.

ELMER SZANTAY, M.E. '35, GENERAL MANAGER

Sandee Manufacturing Company

3945 NORTH WESTERN AVENUE • CHICAGO 18, ILLINOIS

EXTRUDED PLASTICS AND SPECIAL TOOLS



**FOUR OF 25 NEW DIESELS
FOR MARITIME COMMISSION
BEGIN OFFICIAL TEST RUNS**

The photograph pictures a part of the big Busch-Sulzer plant in St. Louis. At the extreme left, one of the main propulsion engines for the Maritime Commission's Type C1-AV1 coastal cargo vessels is making its successful trial run. Next left, a second engine is nearly ready to turn over while the remaining two are rapidly nearing complete assembly.

The C1-AV1 vessels will be used to move troops and materials to combat areas. Each of the twenty-five 4,000 ton ships with Busch-Sulzer Diesels will be propelled by a single direct-connected engine developing 1700 B. H. P. at 180 R. P. M.

Busch-Sulzer also builds Diesels for other Maritime Commission ships and for vessels of the Army and Navy and marine and stationary engines for orders of high priority. Since a tremendous demand for Diesels is expected to continue for several years after hostilities cease, may we suggest that you acquaint us now with your requirements? We build 4-cycle engines up to 1500 B. H. P. and 2-cycle engines up to 7500 B. H. P. in sizes and speeds to suit a variety of needs. Your inquiry will receive prompt attention.

**BUSCH-SULZER BROS.-DIESEL ENGINE COMPANY
SAINT LOUIS**



AMERICA'S OLDEST BUILDER OF DIESEL ENGINES

**BUSCH-
SULZER**
ST. LOUIS



The Spark that Lights the Flame of Victory

A pinpoint of fighting metal placed in the arc of the spectrograph writes its own signature on a photographic plate. Inside the instrument, the light from that flame is broken up by a prism as a prism breaks up sunlight. Each element identifies itself by a series of characteristic lines, always the same for the same basic element. It reveals to the spectrographer each constituent, what impurities are present and in what quantities.

Thus spectrography helps in controlling inspection. It keeps tough fighting steels tough, helps in development of

new fighting metals. Spectrography is used too in other fields . . . chemicals, foodstuffs, vitamins. It speeds research, control, and analysis. Today, spectrography is helping to build the tools of Victory as in peacetime it helps to make better cars and better breakfast foods.

Because Bausch & Lomb had long experience with such precision optical equipment needed in education, research, and industry, it was ready for quantity production of precision optical instruments of war such as gunfire control instruments, binoculars, and aerial photographic lenses. When the last gun

is fired, Bausch & Lomb will devote its enlarged experience to peacetime optical production. Through war and peace, Bausch & Lomb has continued . . . and will continue . . . to do the job it knows how to do best. *Here again optical science is seeing it through.*

For Bausch & Lomb Instruments essential to Victory—priorities govern delivery schedules.

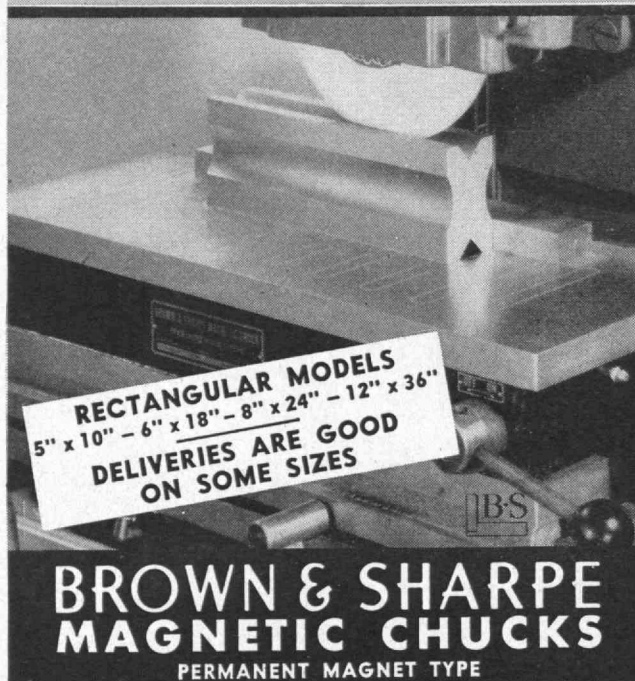
BAUSCH & LOMB
OPTICAL CO. • ROCHESTER, N. Y.
ESTABLISHED 1853

THESE ADVANTAGES SIMPLIFY MAGNETIC CHUCKING

NO WIRES — NO AUXILIARY CURRENT — BUT A
COMPLETELY SELF-CONTAINED CHUCK

Ask your dealer to explain these advantages—or send
for circular—Brown & Sharpe Mfg. Co., Providence, R. I.

For Sale only in the United States of America and its territories and in Canada



BATH IRON WORKS CORPORATION

*Shipbuilders and
Engineers*

BATH, MAINE

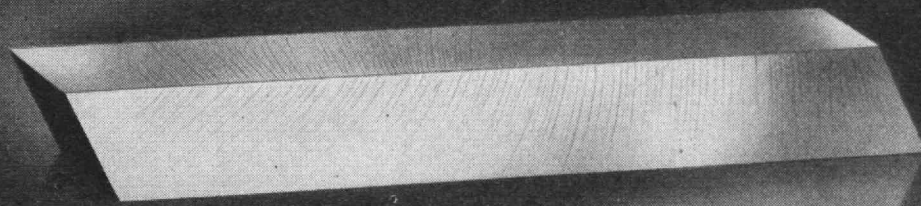
THE TABULAR VIEW

Coadjutor.—From the dynamic beginning days of the electrical industry, which his recent biography of Elihu Thomson presented in vivid detail, DAVID O. WOODBURY begins in this Review (page 419) another graphic story. This is the account of the career of Hermann Lemp, who as a newcomer from Switzerland two generations ago became the assistant first of Thomas Edison and later of Thomson, shared in many of the ups and downs attending the development of basic electrical inventions, and as an inventor himself contributed substantially to the growth of the industry. Mr. Woodbury, who received bachelor's and master's degrees in Electrical Engineering from the Institute in 1922, has written on a wide range of subjects in science and engineering. His work appears frequently in *The Review*, and he is responsible for regular treatment of that field in *Collier's*.

Sesame.—One of the too rare good fortunes of periodical publication is the occasional coming-to-hand of articles which have been written by authors working independently and from individual points of view but which approach a common subject in such wise that the one illuminates and enforces the other. Such a welcome coincidence brings added substance to this issue of *The Review*. The articles in question are those by SIR HAROLD HARTLEY (page 422) and JAMES R. KILLIAN, JR., '26 (page 423). The subject they treat is that of sponsored research as a source of economic strength and social progress. The points of view are, on the one hand, why and how British industry must seek to expand and fortify research of this kind; on the other hand, how and why a great expansion of such research has been administered in a recognized major American center of science and engineering — the Institute. On the one hand, a general problem is posed; on the other, a specific solution is described. The authors are well qualified to analyze authoritatively the subjects they have elected. Sir Harold, whose notable commencement address at the Institute in 1939 appeared in *The Review* for July of that year, was formerly lecturer in physical chemistry at Oxford and is now vice-president and director of research for the London Midland and Scottish Railway. Mr. Killian, for 13 years associated with *The Review* and its editor from 1930 to 1939, became in the latter year executive assistant to President Compton and a year ago was named executive vice-president of the Institute. During the intensive development of Technology's facilities in war research, he has taken a heavy share of primary responsibility; his discussion of the principles and procedures followed in bringing the Institute fully into action as a center of military potential is based on firsthand knowledge.

Provender.—That history often offers commentary on the present and the future is a precept well substantiated by the story of food in the Civil War which GEORGE FORT MILTON tells in this issue (page 426). Both the North and the South then faced agricultural dilemmas equal in difficulty though different in characteristics. The
(Concluded on page 408)

**Now is the time to think
about Molybdenum...**



Taylor and White's great discovery which made possible high speed cutting was the greatest single development to help make mass production possible. The steel developed, commonly known as 18-4-1, served industry faithfully for over thirty years without a serious competitor.

In the early 1930's the first molybdenum high speed steels were used on a substantial commercial basis and, before the Second World War, about 25% of all tungsten high speed steels had already been replaced by molybdenum high speed steels on merit. This steady progress of logical replacement of the tungsten steels was interrupted

by the war because of the tungsten shortage, when many industrial plants were forced to a sudden change to molybdenum steels.

Because of the stress of war production many concerns have never had an opportunity to satisfy themselves thoroughly as to the comparative merits of the molybdenum high speed steels. For those, in this category, who are inclined to return to the tungsten steels, we suggest a serious consideration of the following facts—molybdenum high speed steels perform as well as, or better than, tungsten steels—and they cost less.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING
DATA ON MOLYBDENUM APPLICATIONS.

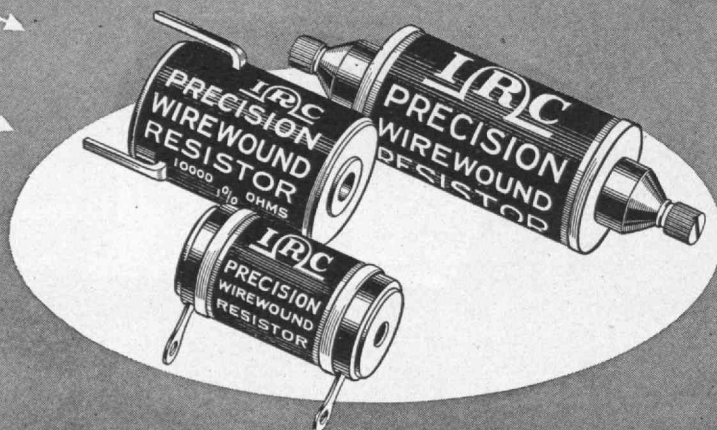


MOLYBDIC OXIDE, BRIQUETTED OR CANNED •
FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

IRC WILL BE READY

with **PRECISION WIRE WOUND RESISTORS**



WHEN IT'S OVER "OVER THERE"

IRC will be in a specially favorable position to supply *all types* of Resistance units—of high Quality—in large Quantity—at low costs made possible by mass production.

FIRST IN WAR . . . FIRST IN PEACE

Produced by the most modern and efficient manufacturing methods, tested and perfected to meet the exacting demands of war, IRC Resistors will maintain their leadership as first choice of electronic engineers, manufacturers and service industries of tomorrow. . . . You are invited to consult our engineering-research staff now, in confidence, on any resistance problems connected with your peacetime products.

CHECK THESE FEATURES OF IRC PRECISION WIRE WOUND RESISTORS

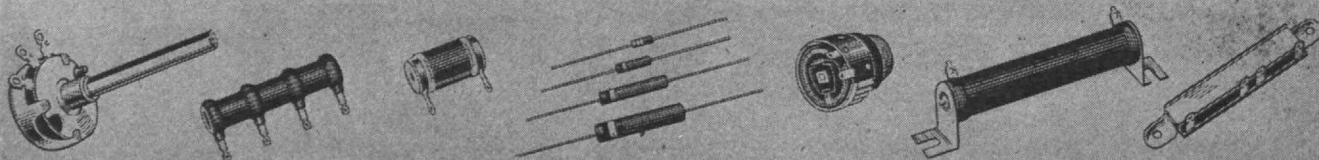
1. Most rigid specifications on enameled wire.
2. Largest size wire used for each resistance value and size.
3. Steatite ceramic (with baked impregnation to prevent moisture absorption and to protect enameled wire from surface abrasions).
4. Specially designed winding machines eliminate stress and strain, avert damage to insulation and minimize fatigue of wire.
5. Baked impregnation of winding insures that wires remain rigidly in place and that resistors are independent of temperature variations.



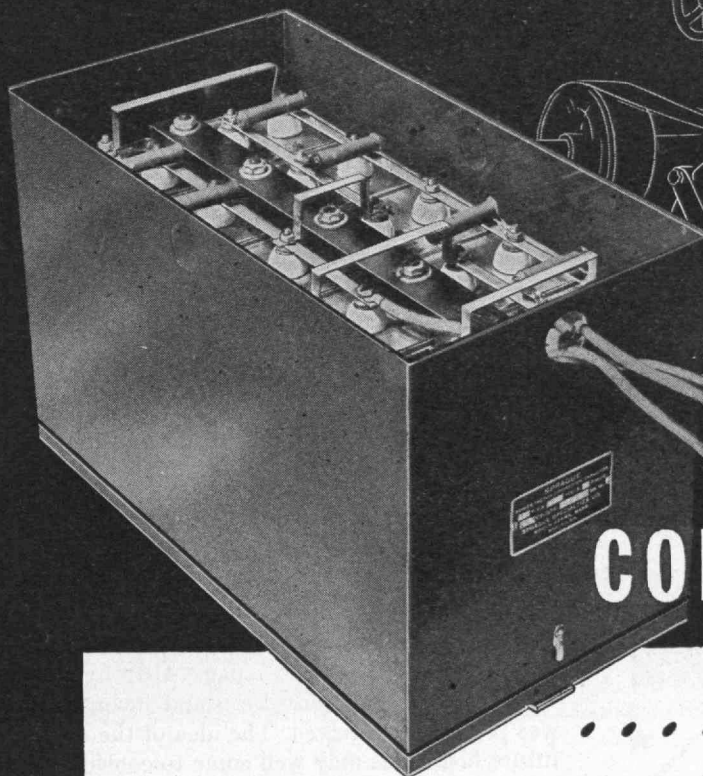
INTERNATIONAL RESISTANCE CO.

401 N. Broad St. Philadelphia 8, Pa.

IRC makes more types of resistance units, in more shapes, for more applications than any other manufacturer in the world.



POWER-FACTOR CORRECTION



need not be
COMPLICATED

.... or costly

It may come as an agreeable surprise to you to learn how easily and economically Sprague UNIVERSAL Box-Type Capacitors can provide adequate power-factor correction for most motors or other electrical equipment installations. Installed at the equipment itself rather than at the trans-

former bank they reduce I^2R losses in plant feeders. Available in standard sizes that may be used singly or grouped as required, they afford a quick, inexpensive solution to a wide variety of P.F. correction problems throughout industry, and result in larger savings and better voltage control.



WRITE for details, including the helpful booklet
"Sprague Capacitors for Power-Factor Correction."

SPRAGUE SPECIALTIES CO., North Adams, Mass.

SPRAGUE

CAPACITORS • KOOLOHM RESISTORS



Our Hat Is Off to Distributors of STARRETT TOOLS *For a Job Well Done*

Getting STARRETT precision measuring tools into hands that can use them where they count most for victory has been the difficult, and often thankless, task of the mill supply distributor. Without his patient, untiring and consistent cooperation, that objective would have proved far more difficult to achieve.

You can count on your STARRETT distributor for dependable assistance on all tool procurement problems — until the last gun is fired, and beyond, for the great re-tooling job of postwar industry.



THE L. S. STARRETT CO., Athol, Massachusetts, U. S. A.

WORLD'S GREATEST TOOLMAKERS

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PRECISION TOOLS • DIAL INDICATORS • GROUND FLAT STOCK
HACKSAWS • METAL CUTTING BANDSAWS • STEEL TAPES

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New York Chicago San Francisco

CLINTON M. HAIG '25
LUCIUS T. HILL RAYMOND STEVENS '17
ALBERT C. SHERMAN, JR. '14

MAIL RETURNS

Admirals

FROM REAR ADMIRAL THOMAS B. RICHEY, '14:

The list of rear admirals on page 271 of the March Review omits the name of Rear Admiral Allan J. Chantry, Jr., '10. Another omission, I believe, is that of a Chinese admiral, Rear Admiral P. T. C. Mar, '15, who is now in this country.

Washington, D. C.

THE TABULAR VIEW

(Concluded from page 404)

solutions which were found were necessarily functions of the terms in which the problems were set, yet they throw light on questions of relief and rehabilitation which are already confronting the United Nations in the present war. Mr. Milton writes from a fund of detailed knowledge of the United States of the Nineteenth Century, of which he has long been both student and historian. He is at present engaged on a volume discussing the use of presidential power in the nation from 1789 to 1943.

Bomber.—A footnote to aeronautical history is contributed to this Review (page 416) by WILLY LEY, whose account of Bouvet's island in our March issue was pleasantly received. The idea of the air raid, which future historians may well come to consider the characteristic technique of the second World War, is by no means of recent origin, as Mr. Ley shows. A specialist in the history of science, Mr. Ley is at present a staff member of the newspaper *PM* and contributor to a number of magazines. Before leaving Germany in 1935 to become a citizen of the United States, Mr. Ley was coeditor of *The Rocket*, monthly journal of the German Rocket Society, of which he was one of the founders.

**Speed with
Economy**



The Pullman Co.

If you have a *difficult* building problem, talk it over with us. In our 27 years of industrial construction, we have overcome many unusual conditions — both on new building and alteration work.

W. J. BARNEY CORPORATION
101 PARK AVENUE, NEW YORK
INDUSTRIAL CONSTRUCTION

Alfred T. Glassett, '20, Vice President

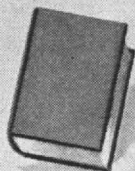
*What would you do with some
3,3,5-trimethylcyclohexanol-1?*



textiles?



lubricants?



adhesives?



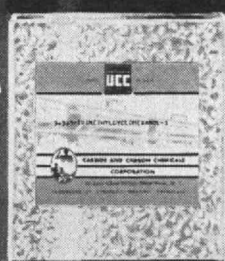
insecticides?



pharmaceuticals?



plastics?



EVEN we know only a little of what you might do with it... yet. Trimethylcyclohexanol (you pronounce it try'-meth'-il-sy'-klo-hex'-an-ohl) is a new industrial chemical by CARBIDE AND CARBON CHEMICALS CORPORATION...made with atoms obtained from common substances, rearranged into molecules that are not known to exist in nature.

What's this new synthetic organic chemical good for? No one yet knows all of the useful things it might be made to do. If you are technically minded you'll find some of the facts so far discovered in the italicized paragraph at the right. Whatever your interest, you will be glad to know that this new chemical has potential uses in the making of such things as medicines, plastics, lubricating oils, and adhesives.

In their service to industry as incubators for raw materials, the laboratories of this Unit of UCC are continually developing such new chemicals. An almost predictable percentage of them prove to be extremely valuable. Out of hundreds already developed have come scores from which scientists in industry have developed useful products of many kinds.

Some of the chemicals are used to make superior anti-freezes. Others are raw materials for quantity production of vitamins and life-saving drugs. Still others make possible improved cos-

metics, plastics, textiles, photofilm, insect repellents, anesthetics...and hundreds of things of benefit to you in your daily life.

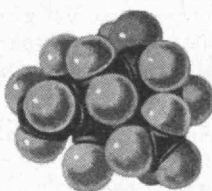
Through continuing research which is developing new materials out of common substances, CARBIDE AND CARBON CHEMICALS CORPORATION is helping to make many things more plentiful or more useful. And the research of this one Unit...in that field which often must appear to the layman as "unknown chemicals"...gives you an idea of what the combined research of all UCC Units in many basic fields means to you.



As Trimethylcyclohexanol is one of the newest additions to this family of synthetic organic chemicals, its story is still incomplete.

It is an alcohol with a high boiling point (388° Fahrenheit). At room temperature, it is a white solid with an odor like menthol. It dissolves in other alcohols, gasoline, benzene, ethers, and vegetable oils like linseed oil, but does not dissolve in water. It can be supplied in carload quantities if and when the need arises.

Technically minded men and women can obtain information on the properties and uses of more than 160 other products of Carbide and Carbon Chemicals Corporation by writing for Booklet P-5, "Synthetic Organic Chemicals."



Model of Molecule
of Trimethylcyclohexanol

BUY UNITED STATES WAR BONDS AND STAMPS

UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street UCC New York 17, N.Y.

Principal Units in the United States and their Products

ALLOYS AND METALS

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Haynes Stellite Company
United States Vanadium Corporation

CHEMICALS

Carbide and Carbon Chemicals Corporation
ELECTRODES, CARBONS AND BATTERIES
National Carbon Company, Inc.

INDUSTRIAL GASES AND CARBIDE

The Linde Air Products Company
The Oxweld Railroad Service Company
The Prest-O-Lite Company, Inc.

PLASTICS

Bakelite Corporation
Plastics Division of Carbide and Carbon Chemicals Corporation

Machine tools give meaning to this

jury's verdict!



It wasn't much of a story. By news standards today it was strictly Page 14. The night City Editor slugged it "delinquent—local" and the man in the slot gave it a one-column head. **JURY BLAMES SLUMS FOR JUVENILE CRIME.**

"Health stations, more hospitals and schools, recreational and training facilities, low-cost housing projects and community centers were recommended by the grand jury, in its final presentment yesterday, as measures to check the rising tide of juvenile delinquency in this etc., etc., etc."

Few people read it. In the midst of war and politics, it was strictly Page 14.

That's why we're running it. Because that story should be a Page 1 **MUST** in every city in America. Because that jury's verdict is a *national* challenge. Because it gives the lie to every brand of private or political complacency which turns away from one simple, unvarnished truth: Our sons are fighting for a *better* world than they left behind—and total victory is a long way off!

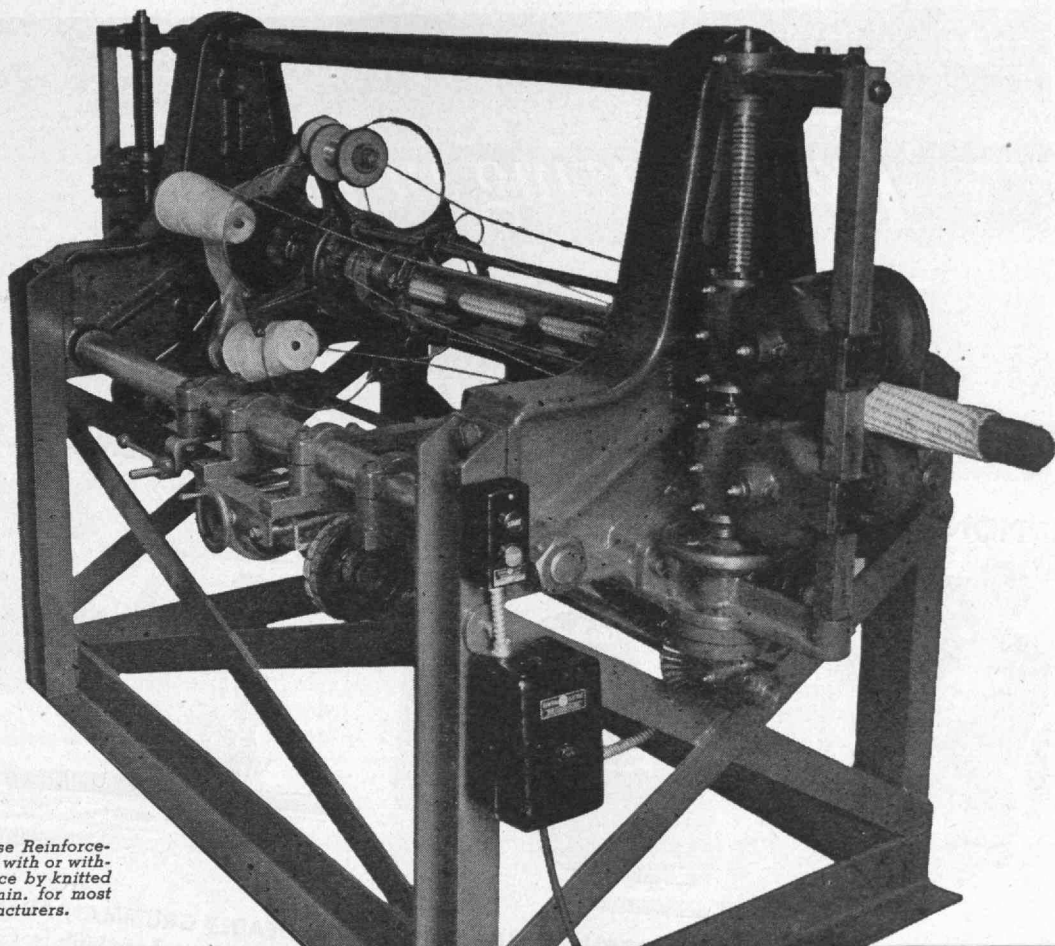
What has the machine tool industry to offer here? One very real contribution: The engineers of the basic machine tool producers have helped the men of government and of industry to plan the most desperate and gigantic production program of all time. . . and they can help those same men in planning today for the peace that must be won after the war is won!

One of these is a Bryant man. We invite you to send for him.



Bryant Chucking Grinder Company

SPRINGFIELD, VERMONT, U.S.A.



FIDELITY Horizontal Hose Reinforcement Machine applies yarn with or without 1 or 2 wires tied in place by knitted cover at 4 to 10 ft. per min. for most leading rubber hose manufacturers.

MINUTE CLIPPING IS MULTIPLIED BY THIS **FIDELITY** MACHINE

TO STEP UP PRODUCTION OF RUBBER HOSE

This is but one of a number of FIDELITY machines that have contributed to the logistic time table on all fronts and will find important post-war applications in the transition period.

Among the others—all of which multiply manpower, reduce horsepower, cut costs or otherwise contribute to better production—are such varied and different machines as wire spoolers, glue or resinous bond spreaders, fabric testers, fringe-making machines, wear-measurement machines for lubricants, bag closers, machines to apply two or more weatherproof coverings to wire, skein reelers, packing braiders, and many others.

FIDELITY has developed a long line of machines—many of them for highly specialized operations, with mechanical, electrical, hydraulic, pneumatic or electronic controls.

It is quite probable that FIDELITY could develop and manufacture such a machine for your needs. To help you appraise this important service, write for "Facilities," a well-illustrated book.



Buy **BONDS** to Bring the Boys Down the Home Stretch

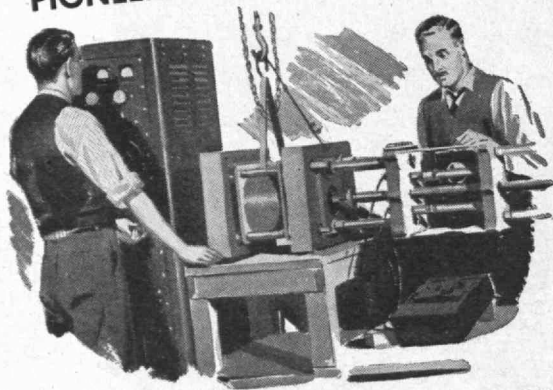
Intricate. Automatic Precision Machines
FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE

PHILADELPHIA 24, PA.

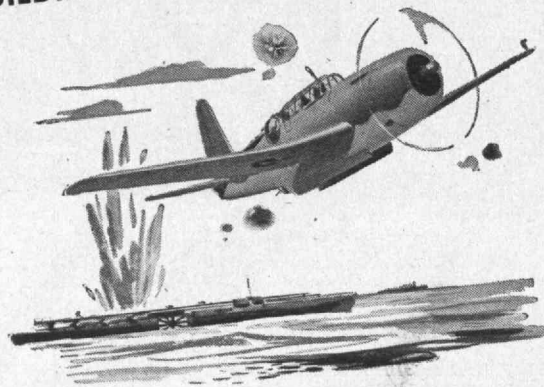
Trail Blazing in the Skies

PIONEERING NEW METHODS



A SURER WAY TO MEASURE STRUCTURAL FATIGUE developed by the Goodyear Aircraft Corporation is the Resonance Fatigue-Testing machine. This ingenious device employs electric impulses to induce the natural vibration frequency of aircraft parts under simulated operating conditions, making it possible to determine fatigue characteristics with a high degree of accuracy. It can duplicate most types of fatigue, including alternating or pulsating stresses in structural parts made of steel, aluminum, or other alloys... whether they include riveted, brazed, or welded joints. Its utility is evidenced from its use by the U. S. Bureau of Standards.

BUILDING PROVEN AIRCRAFT PARTS



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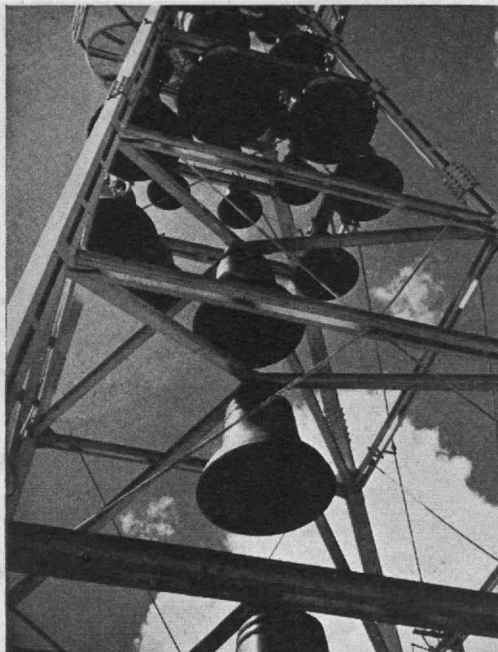
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1. By constructing subassemblies to manufacturers' specifications.
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Benjamin W. Irwin, Jr., '38

Bells at a Zurich exposition

VOLUME 46

NUMBER 7

THE TECHNOLOGY REVIEW

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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From a photograph for the Eastern Malleable Iron Company

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Gullers from Black Star

VISTA

The gallery in the Swedish royal castle in Stockholm, built about 1690

THE TECHNOLOGY REVIEW

Vol. 46, No. 7



May, 1944

The Trend of Affairs

Water Wings

THE picture of this war's small, high-speed watercraft is sharply definite: It varies little in basic characteristics from navy to navy, and it follows — with improvements to be expected in 25 years — the pattern laid down by the fast coastal craft used most notably by Great Britain and Italy in the last war. Whether American PT boats, British M.T.B.'s, German "Eagle boats," or Italian M.A.S.'s, they are lightly built, heavily powered, hard-chined, broad-sterned planing craft. When at speed, which may mean considerably better than 50 miles an hour, they do not force their way through the water as does a vessel of conventional, round bilge, but they more or less slide over the water. It is admittedly a complex and carefully worked out sort of sliding, with provision for good directional stability, for good maneuverability and, above all, for riding about equally well, whether on the heaving, broken surface that usually forms the interface between sea and air or on calm water. In the naval architect's parlance, these craft are hydroplanes.

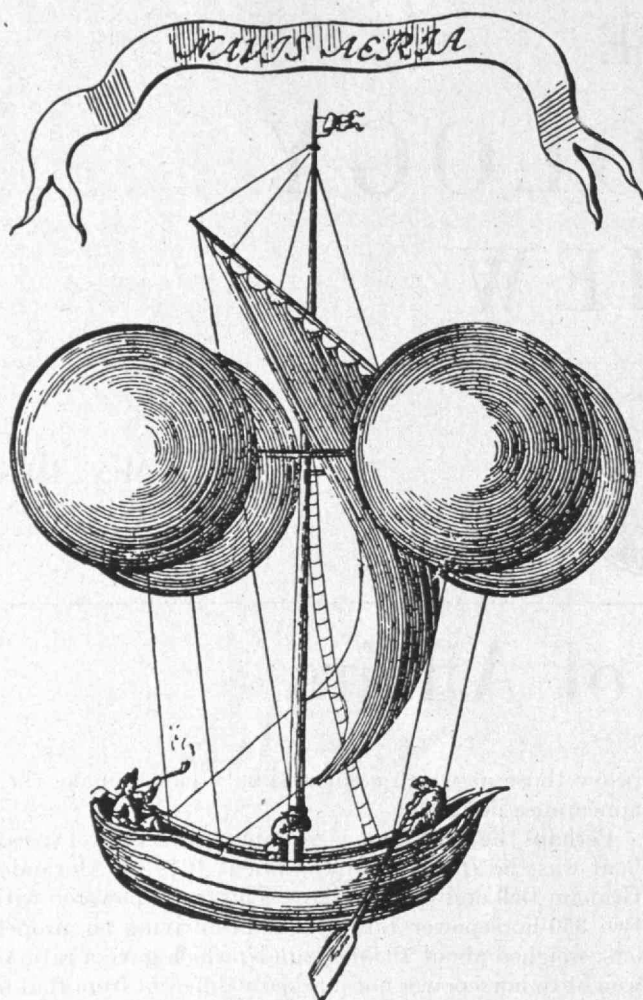
For more than a quarter of a century, however, experimenters have been demonstrating that vessels of this type are by no means the only form of hydroplane capable of attaining high speed, good maneuverability, and excellent performance in rough water. There are also boats which are supported not on their bottom surfaces but on planes or wings completely submerged in the water and capable of lifting the hull entirely free of the sea. This type of hydroplane is the true analogue of the airplane, for, like airplane wings, the carefully contoured hydrofoils with the water flow creating a low-pressure region above them obtain lift from both their top and bottom surfaces. Because water is more than 800 times as dense as air at sea level, this lift may exceed 2,000 pounds per square foot, compared to the 40 or 50 pounds per square foot that are excellent for an airplane wing. Difficulties with cavitation, however, have so far put a ceiling on lift at speeds far

below those at which compressibility effects make their appearance in air.

Perhaps the most famous example of this type of speedboat was the *HD-4*, produced about 1919 by Alexander Graham Bell and his associates. This craft, powered with two 350-horsepower Liberty engines driving air propellers, weighed about 10,000 pounds, which gave a ratio of weight to horsepower not markedly different from that of present-day torpedo boats, one of which might weigh 28 tons and use three 1,000-horsepower engines. Nor is this ratio far from that encountered in many large planes. The maximum speed of the *HD-4* was about 70 miles an hour.

A characteristic which is attested to by almost all who have operated such hydroplanes is their unusual smoothness in rough water, the boat or plane (for the idea has been proposed as an alternative to a stepped bottom on seaplane hulls and floats) acting as if mounted on shock absorbers. The Italian general, A. Guidoni, after long and intensive trials of hydrofoils, considered this steadiness in rough water as their outstanding advantage, and a contemporary witness of some trials of the *HD-4* observed: "Then you notice that you are traveling [at 60-odd miles per hour] over waves a foot and a half high — waves that would take the bottom out of an ordinary hydroplane traveling at such a speed. There is no pounding or jolting of the kind with which everyone who has ridden in a racing hydroplane is familiar."

But the navies of the world are still building hydroplanes that ride on their bottom surfaces, not on submerged hydrofoils. Hydrofoils have thus far proved somewhat fragile and subject to fouling by seaweed or trash, and the draft of a boat so equipped is increased. At high speeds, stubborn problems in cavitation are encountered, and the drag of the foils plus the interference between them and their supports has apparently permitted no greater efficiency than that achieved with more conventional planing boats. But the principle is still deeply intriguing and cannot be dismissed as a dead issue, for many of the problems are of a nature which may readily yield to



The aerial ship of Father Francesco Lana de Terzi, as depicted in an old print, with a passenger at ease in the stern

a greater knowledge of fluid mechanics. In engineering as in law, the soundest approach is to consider the method right until it is definitely proved wrong.

The Benevolent Shark

ON the surface, it is hard to say who is more surprising to the thoughtless, the Chinese who hunts sharks for their fins or the white man who hunts them (and other fishes) for their livers. Regardless of the general merits of fins versus livers, the pursuit of the latter appears to have become the more important activity. With the spreading of knowledge about the nutritional value of vitamin A, noted for its ability to aid growth, increase resistance to infections, and prevent night blindness, vitamin-bearing oils have become an important and almost world-wide by-product of the fishing industry, for fish livers, once thrown overboard as offal, are still virtually the only important commercial source of vitamin A. The war, while interfering with fishing, has also stimulated demand for this vitamin and cut off important sources, such as Norway. Plants for the extraction of shark and other liver oils have recently been erected in Australia, New Zealand, Spain, Brazil, and Uruguay, and the South African fish-liver industry, which was established in 1941, was expected to produce approximately 100,000 United States gallons in 1943. India has a shark-liver oil industry of long standing which, though producing thousands of gallons

of oil annually, is far from meeting domestic requirements. Newfoundland exported 310,000 United States gallons in the fiscal year 1940-1941.

While the average daily requirement of vitamin A is not known precisely and undoubtedly varies with the individual, one widely used reference puts it at about 1,500 United States Pharmacopoeia units daily for infants under one year of age and about 4,000 U.S.P. units daily for adults. By these standards, the amount of vitamin A obtainable from one large fish can be staggering. Consider, for example, the number of babies' breakfasts which could have been made miserable by one great hammerhead caught off Florida. Its liver oil yielded 126,000 units per gram for a total of 4,735,000,000 U.S.P. units of vitamin A.

Since the commercial value of oil that bears vitamin A increases with concentration and since rich sources are also less costly to exploit per unit of vitamin, considerable attention has been paid to the yields to be expected from various types of fishes. Fishes considered to be better than average sources of vitamin A are expected to show 10,000 U.S.P. units and more per gram of liver oil. The stone bass, found off South Africa, is reported to show an exceptionally high concentration. The bagre holds that distinction in south Atlantic waters. The hake is a good source, and it has been known for some time that sharks and dogfish will in general show much higher concentrations than will the cod. But there are sharks and sharks. Off California, where a notable shark fishing industry exists, the soup-fin shark is the outstanding celebrity. Off Florida, where another shark fishery exists, Stewart Springer and Price M. French have recently completed a survey which indicates that the sharks which fishermen should strive most to catch are adult hammerheads, dusky sharks, and bull sharks. On the other hand, nurse sharks, tiger sharks, great white sharks, sawfish, and rays are in general mediocre sources as sharks go. One ray examined showed a trifling 35 U.S.P. units per gram of liver oil compared to 340,000 units for the richest specimen tested. Curiously, the great hammerhead (*Sphyrna tudes*), which appears to give oil of the highest potency, has been recognized as a native of our waters only during the past few years, and the authors of the report believe that further investigation might disclose new and profitable sources of vitamin A.

"Father of Air Raids"

BY WILLY LEY

A FEW days ago I received a letter from a British engineer who, in the course of a discussion of technological principles, suddenly interrupted himself to say: "Strange how conceptions of magnitude change; 450 tons of bombs seemed enormous when they happened" (this was the heaviest German raid on London during the Battle of Britain) "and now we take a 2,000-ton raid for granted. By the way, is it true that Pancho Villa is the father of air raids?"

The question is ticklish simply because the idea of air raids has several "fathers." It is true that Pancho Villa is one of them, although not the first or earliest. In 1912 Pancho Villa employed an American pilot, Lester Barlow, to drop on his enemies homemade bombs consisting of iron and dynamite. The plane used was a Curtiss, and

Pancho Villa was sufficiently impressed with the results to wire his pilot's brother, Floyd E. Barlow, offering him a salary of \$2,000 a month to join in the venture. (The other Barlow declined.)

The Villa-Barlow exploits are, in all probability, the first bombings from the air in the Western Hemisphere, but they are not the first in history. One year earlier the Italians used ancient Farman biplanes to drop bombs on Arab tribesmen at Bengasi and in the vicinity of Derna — names which acquired prominence again in the present war. The few existing reports about these Italian exploits of the year 1911 make it appear extremely doubtful that the bombings actually did much damage or caused many casualties. At any event the ground forces reported that they did not derive any noticeable benefit from the exploits of the airmen (a state of things which, once inaugurated, quickly became an Italian military tradition). On the other hand, the morale of the Arabs was greatly shaken by the "flying machines" of their enemies.

Going back some more in history, one can find casual mention of bombings during the Franco-Prussian War of 1870-1871. When Paris was under siege, the Parisians built balloons to transport dispatches and, on occasion, to transport important men from the city to unoccupied parts of France. This balloon traffic was the direct reason for the design and construction of the first antiaircraft gun, a one-inch Krupp piece mounted on a cart drawn by four horses. There are reports that this gun was used against French balloons, but there is no report that it ever hit anything. There are also reports that the balloonists dropped crudely made bombs on the German lines when crossing them overhead, but again there are no reports that they hit anything.

Just before that war an attempt at bombing from the air was made in Japan, during the civil war of 1869, when government forces besieged the fortress of Wakamatsu. The rebels sent up a huge kite which carried one man who tried to score hits from the air with hand grenades.

By that time, however, the first actual air raid was already two decades old. The target had been the city of Venice, and the attack had been made by the Austrians. That air bombardment of 1849 was a complicated maneuver, and the political background for it was just as complicated. Venice, the Queen of the Adriatic, had become part of Italy under Napoleon and, still later, a part of one of the numerous provinces of the Austrian Empire. In 1848 Venice decided to rebel and to secede. The Austrians answered by laying siege to the city.

But the siege dragged out. It could be ended, the Austrian commander reasoned, only by a solid bombardment from siege guns. Which was a fine idea as far as it went, except that no place for the siege guns could be found, the ranges of guns being what they were in those days. Then somebody suggested a new and no doubt secret weapon: Venice would be forced to its knees by air bombardment. The positions were such that almost any wind would carry a balloon over the city from one point of the Austrian lines. Of course there were not enough balloons of full size to be had, nor were experienced balloonists available.

This difficulty could be circumvented, however. Manned balloons were not necessary — any balloons would do as long as they were large enough to carry a bomb. The Austrians got busy on the project and emerged with many dozens of paper balloons that were inflated with hot air. They were large enough to carry for half an hour a bomb weighing 33 pounds. The bombs were equipped with a time fuse which severed the connection, usually by means of a small skyrocket that set fire either to the rope holding the bomb or to the balloon itself.

The results were rather discouraging; the population of Venice failed to be frightened to death by the bombs that fell from the sky on occasion, even though one of them burst squarely in the center of their beloved Piazza di San Marco. Worse than that, the invention began to backfire: Every once in a while a time fuse would not function properly, or a sudden freshening of the wind would carry the balloon clear across the city before the timing device had run its course, or the wind would shift. At any event, several of the bombs burst in the Austrian lines. For this reason the new weapon was taken from the production lists after some 300 had been made and tried.

This raid on Venice seems to be the first air raid that was actually made. Just who conceived the idea is not known. But the idea of an air raid, provided that one could build something that would fly, is much older.

It is an interesting fact that the theoretical inventor of the balloon is also the originator of the idea of air raids. The balloon was actually invented in 1783 by the brothers Montgolfier, who were at first not too sure exactly why their paper balloon ascended. Nor did they at first consider military applications. Nor, it may be added, did they know anything about their predecessor who not only understood the theory of the free balloon thoroughly but who also foresaw the use of such an invention for air raids. He was a Jesuit priest, professor of mathematics at the University of Ferrara between 1677 and 1679 and founder



Official photo, United States Army Air Forces

By way of contrast, here is a modern military transport plane, the Douglas C-53, being loaded.

of the Scientific Society of Brescia. His name was Francesco Lana de Terzi, and he lived from 1631 to 1687. The last years of his life were spent in writing *Magisterium Naturae et Artis*. The first volume appeared in 1684, the second came out one year before his death, and the third was brought out posthumously in 1692. The airship appeared in volume II, as *Artificum XLVI*.

It was not merely a wild idea; Francesco Lana progressed very systematically with his exposition. First of all, he stated, air has weight. Then he tried to determine how much. He then declared that "any large vessel can be entirely exhausted of all, or, at any rate, of nearly all, the air contained therein." The fourth point was that a globe, when its size is increased, gains volume much more rapidly than it gains surface. The fifth point was that "when a body is lighter . . . than another, the lighter one will ascend in the heavier one if the heavier is a liquid body." He arrived at the conclusion that "it is certain that one can construct a vessel of glass or other material which could weigh less than the air contained therein; if, then, one exhausted all the air . . . this vessel would be lighter in density than the air itself and . . . would float on the air and ascend."

It was perfectly clear and logical and correct. The only place where Father Lana slipped was that he forgot what pressure the outside air would exert on an evacuated vessel. This was something that was not properly known then. Other and less valid criticism must have been leveled at Father Lana because he answered his critics in his book. As a matter of fact he accepted only one objection (apparently his own): "that God would never surely allow such a machine to be successful, since it would create many disturbances in the civil and political governments of mankind."

Just what kind of "disturbances" he had in mind becomes clear immediately. "No city would be proof against surprise," he wrote. And flying ships might kill the crews and sink ships at sea by flying over them and dropping heavy weights of iron. Or else they might be steered over the city square and set fire to government buildings and dwelling houses by means of "fireballs or bombs." Or they might drop iron weights or heavy rocks on buildings, making them collapse.

It was this realization of military use which made Father Lana wonder whether God would permit the invention of a flying ship. But it is this fact which shows that Lana, the first to invent a type of aircraft which was theoretically sound (even though actually impracticable and "impossible" as far as actual building goes), was also the first to visualize the possibilities of air raids.

New Source

PLANTINGS of 40,000 acres — 12,000 in Costa Rica alone — are destined to make abacá, better known as Manila hemp, at home in the New World. Decision to foster intensive cultivation of abacá in Central America was of course precipitated by the needs imposed by the war, for when the Japanese overran the Philippines, the United States lost virtually all its supply of Manila fiber, without which both merchant and naval fleets would be seriously handicapped. But the decision was in itself no innovation, for a history of a half century of scientific interest in such a project lies back of the new plantations. Efforts were made at the turn of the century to bring seeds of abacá to

germination in various Latin American countries, but to no avail. Then in 1925 an agent of the United States Department of Agriculture brought more than a thousand rhizomes and suckers of the plant from the Philippines to the Canal Zone. Carefully tended, some 500 of the plants were brought to successful growth at a quarantine station on Columbus Island, off the mainland of Panama. It is their progeny which two decades later provided for the planting of more than 26,000 acres of abacá in Costa Rica, Guatemala, Honduras, and Panama. The full 40,000-acre venture, it is expected, will supply from 50,000,000 to 60,000,000 pounds of Manila fiber each year, this total being enough to meet about half the pre-war demand of the United States.

Atajo

SECTIONAL radio antenna masts of tubular plywood, flown in to captured airfields, are another recent utilization of plastic-bonded veneers in war. Supplied in 50- and 75-foot heights, the masts are made of plywood tubes four inches in diameter, with walls three-eighths of an inch thick. The sections are joined by sleeve couplings. Three men can erect the mast and have the radio in operation within 30 minutes. Two miles of the plywood sections — enough for 150 of the 75-foot masts, can be loaded in a single trailer truck. ¶ In use for more than a year in the manufacture of 12-cylinder aircraft engines, a practical method of bonding pure aluminum to steel was recently announced. The new process produces a chemical bond between the two metals, thus making possible ready heat transfer from the steel barrel of an engine cylinder to aluminum cooling fins and also rendering ineffective the difference in expansion characteristics of the two metals. It hence marks a distinct advance over the earlier method of shrinking an aluminum muff onto steel cylinder barrels, which could produce but mechanical contact between the two surfaces, with resultant variations in heat transfer. Applications of the process to other needs, such as aluminum-bonded steel-backed bearings, cladding of exhaust systems, and assemblies for heat exchangers, are being developed. ¶ Twenty-eight sets of precision aircraft engine parts can now be supplied for the price which ten such sets commanded last year. The saving is regarded as largely the result of further application of mass production and standard industrial tooling practices to the manufacture of military matériel. Recent announcement of contract renewal for the production of 4,500 bombing planes brought forth comment that the price of these planes in 1944 will represent an aggregate saving to the government of more than \$450,000,000 over the prices of two years ago. ¶ The pith and fiber of the scrub palmetto, which has hitherto been considered a worthless plant, are being processed into ordnance items and such civilian goods as wallboard, floor and wall tile, cold-storage insulation, steam-pipe coverings, gaskets, plugs, spools, fishing-rod handles, brush bristles, upholstery, and twine. The supply of palmetto is judged inexhaustible; Florida contains 17,000,000 acres of land dotted by the scrub. ¶ A technique similar to that used in powder metallurgy is employed in pressing powdered glass into shapes and fusing it by heat. ¶ Identifying threads in paper currency, formerly made of silk, then of nylon, now are of dyed cotton. ¶ Investigators studying nitrogen as a substitute for air in filling (Concluded on page 458)

Inventor's Progress

How Hermann Lemp Began with Thomas Edison and Continued with Elihu Thomson a Career of Interest and Value in Electricity and Industry

BY DAVID O. WOODBURY

ARE you killed, Mr. Lemp?" Thomas Edison hastily switched the current off his electric locomotive and jumped to the ground. The temperamental contraption had suddenly gone into reverse, thrown Hermann Lemp off, and run over him. But Lemp had nimbly crawled from under and sat in the ditch rubbing his bruises. When one worked for Edison, emergencies were everyday affairs. It was part of the job to jump clear instantly when the unexpected happened.

Satisfied that he had not damaged his young assistant, Edison returned to the visiting railroad magnate to whom he was trying to sell his locomotive, and threw on the power. Lemp watched them plunge around the next bend without him. This was the life of an Edison man at Menlo Park in 1882.

At that time Hermann was 20 years old — a young Swiss immigrant who had worked for Edison less than six months. He had come to this country with the proverbial dime in his pocket, asked for a job with the most famous man he could think of, and got it. Edison was then tackling the gigantic problems of erecting an incandescent lighting system in New York. He needed every enterprising young man he could get.

Lemp's first job was to assist Edison's designer, Herman Claudius, in building a model of the proposed distribution system for lower Broadway. The model was to be made out of German silver wire. Lamps and feeders

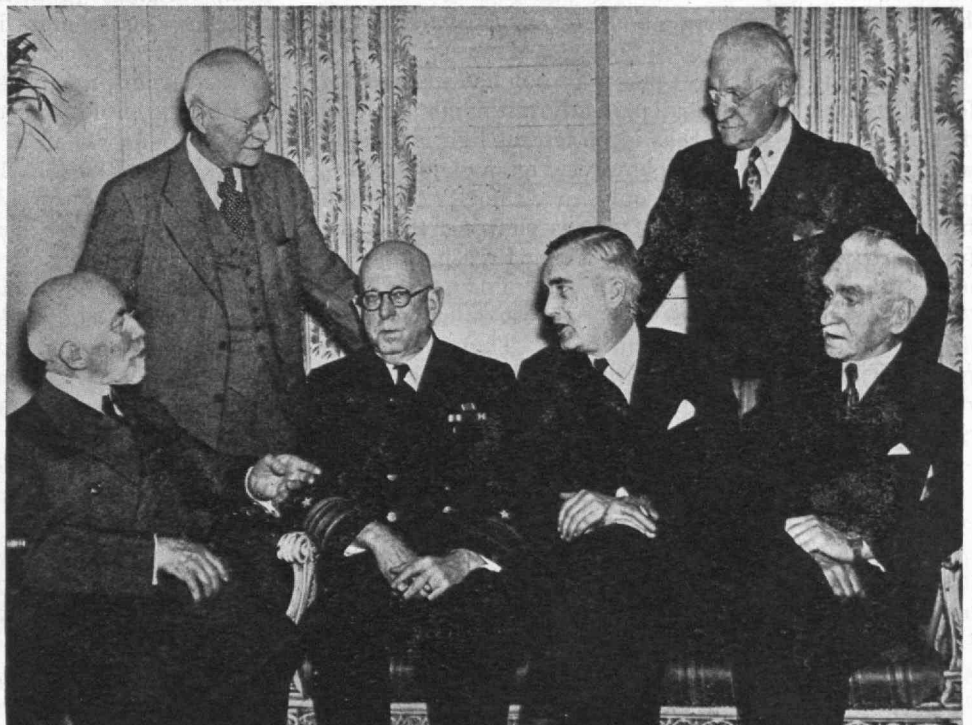
were represented by small resistance coils; by experimenting with the model to obtain a 2 per cent voltage drop at the end of each circuit, Lemp hoped to calculate the necessary feeder copper exactly. He succeeded so well that Edison put him to work inventing a machine which would make incandescent lamp filaments out of cotton thread. All the available skilled labor in New York could not make them fast enough by hand.

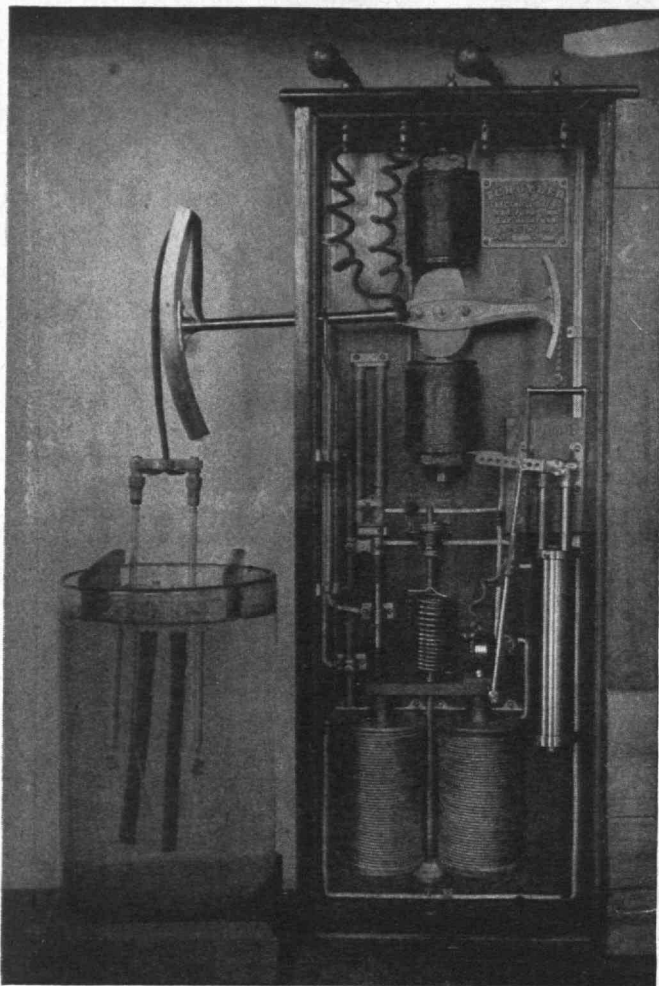
Hermann took the assignment very seriously and toiled for days over a drawing board working out his ideas. One day Edison suddenly leaned over his shoulder and said: "Lemp! You've lost a whole week making those drawings. Why don't you build the machine?"

That was the beginning of Lemp's real understanding of invention, American style. You plunged straight into a job, thinking on your feet, visualizing, carrying out ideas with such materials as were at hand. You built the invention first, then went back and designed it afterward. It was a procedure he learned to use constantly — one that made him the author of more than 200 patents, many of them basic to our present way of life.

When the thread twister worked, Lemp got a leave of absence to return to Switzerland to get married. But the home country held little allure. Hastily he returned to America with his bride and went to work again for Edison, taking care at once to become an American citizen. "If I'm going to live in a country," he said, "I'm

At the 26th annual meeting of the Edison Pioneers on February 20, 1943, Hermann Lemp forgathered with others associated with the great inventor. Left to right are Edwin W. Hammer, who was at that time the retiring President of the organization; Mr. Lemp; Rear Admiral Harold G. Bowen; Charles Edison, '13, then governor of New Jersey; J. Parker Hickman; and Frederick W. Jesser, who succeeded Mr. Hammer as president of the Pioneers.





An arc lighting machine regulator which Mr. Lemp invented for the Schuyler Electric Light Company in Hartford, Conn.

going to be one of them." Soon he was promoted to chief tester of switches and sockets in one of Edison's manufacturing outfits. Tiny Mrs. Lemp went to housekeeping in an equally tiny flat, and without knowing a word of English set about making a home for her husband in this exciting new land.

The famous Pearl Street power station had just opened for business, and operated perfectly, although the prediction had been made that incandescent lighting would wreck New York. Edison, however, ignored his critics, perfectly confident that he could force the city to switch from gas to electric light. He was showing the same furious drive that had caused a young British employee of his Edison Telephone Company in London to remark: "These Americans are crazy. They insist on being slave-driven with genuine American oaths. They work with ferocious energy out of all proportion to the actual results achieved." Invective worthy of George Bernard Shaw himself. And with good reason, for it was Shaw who said it, upon being fired from Edison's employ.

By Christmas of 1882, 5,000 incandescents burned in New York, although Edison had stopped giving the current away free. Gas company shares were dropping like lead weights on the stock exchange, while Edison's had gone from \$100 to \$3,500 in three months. Hermann Lemp, too, was on his way up and was soon holding down a good job in the Schuyler Electric Light Company — an independent concern in Hartford, Conn. Here, with

Merle J. Wightman, he invented an automatic cutout which allowed incandescents and arc lamps to be burned on the same circuit.

As the decade of the Eighties progressed, powerful rivals appeared. Elihu Thomson, of the Thomson-Houston Electric Company in Lynn, invented an incandescent that burned longer than Edison's, and devised the alternating-current system for distributing current. Westinghouse added valuable transformer patents, and by 1887 the Battle of the Currents was on in earnest. Edison's country-wide system of direct-current power stations was under full attack; his competitors were buying men and plants away from him right and left. Schuyler Electric fell to Thomson-Houston, and Lemp was one of the assets that went with it. Thus in that year he found himself transplanted to Lynn to become, in a short time, an assistant to Thomson himself.

Lemp arrived at his new job with some awe, for Professor Thomson was a scientist of international reputation who already had marketed a successful arc-light system, had invented the repulsion-induction motor, and was becoming world famous as the father of electric welding. Lemp expected to find Thomson a lofty, distant gentleman, never to be spoken to unless he spoke first — "a man aloof, unapproachable, a kind of domineering intellect," as he expressed it. So for the first few weeks he kept to himself at his bench in the "model room" and worked hard and silently.

In this model room he soon fell in with another employee who seemed almost as young and quite as shy as himself. They chatted pleasantly about the work and became good friends. Thinking that it would be nice to have an ally when the great Thomson finally appeared, Lemp asked the shop foreman who this pleasant young man was.

"Him!" cried the foreman. "You mean to say you don't know? Why, that's Professor Thomson."

The professor took an instant liking to this young fellow, who obviously possessed the inventor's resilient mind and mechanical courage. Presently he began to give Lemp original problems to solve: the designing of switches, fuses, and lightning arresters for the new electric "trolley car" — new applications for the magnetic blowout principle he had patented five years before. It was the professor's delight to do his inventive work with a younger man at his elbow, in a kind of teacher-and-pupil relationship. Explaining everything as he went along, sharing the problems, putting the protégé on his mettle, he invariably inspired his assistant to do important thinking of his own. Lemp thus became a perfect anvil upon which Elihu Thomson could strike out a constant shower of sparks. The two spent hours together, discussing, planning, talking over everything under the sun. Out of this relationship came such important new devices as the first oil switch, the constant-current transformer, and the earliest integrating wattmeter.

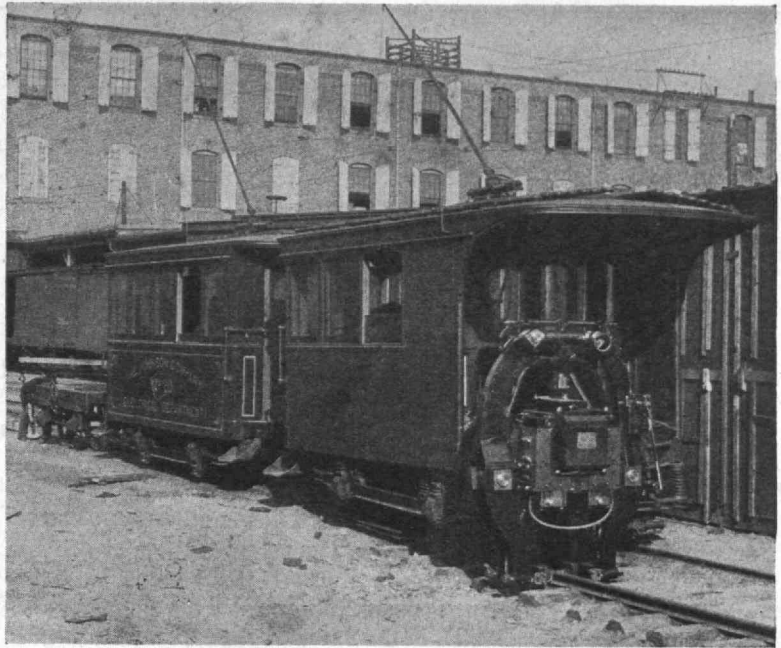
Lemp adored the professor, as everyone who knew him did; often they would walk home together in the evening, oblivious to everything but the technical point in discussion. Sometimes they would stand on a street corner for an hour, thrashing out some detail to be accomplished on the morrow. Lemp came to have the position of an affectionate attendant, watching over the professor, answering to his every mechanical need, ready always with an attentive ear, a bit of needed information,

sometimes even with good advice. But he was also a skillful and original engineer in his own right, and Thomson presently took cognizance of that fact.

Electric resistance welding was by all odds the most important invention occupying Professor Thomson at this time. Ten years before, he had hit upon the principle while lecturing before the Franklin Institute in Philadelphia. But being absorbed then in building dynamos and arc lamps, he had not patented the idea till 1885. Now, two years later, he had devised the famous "jew's-harp" transformer, using a single hinged loop of heavy copper bar for the secondary winding. Welding currents of 1,000 amperes or more could easily be obtained with it from the 110-volt mains in the plant. Other, more compact welding apparatus had followed. The art had become a commercial prospect of such great promise that the professor had decided to organize a separate company to exploit it.

In the fall of 1888 Thomson offered Lemp the position of chief engineer in the Thomson Electric Welding Company. "We need a man," he said, "who is not afraid to tread on virgin soil. I think you fill the bill." With quiet confidence Hermann took the job, and remained in it seven years. Setting up the jew's-harp coil and other welders in a tiny building near the plant, he began demonstrating to astonished visitors the welding of iron bars and links of chain. Soon butt welds could be made in rods an inch in diameter.

The magic of the new art brought scores of manufacturers to the plant, and Lemp and his assistants arranged demonstrations calculated to impress each one in his special field. Practically every visitor immediately placed an order for a machine. In no time at all, Thomson



A street railway welding train, utilized in the biggest welding job of the Nineties — that of joining streetcar rails

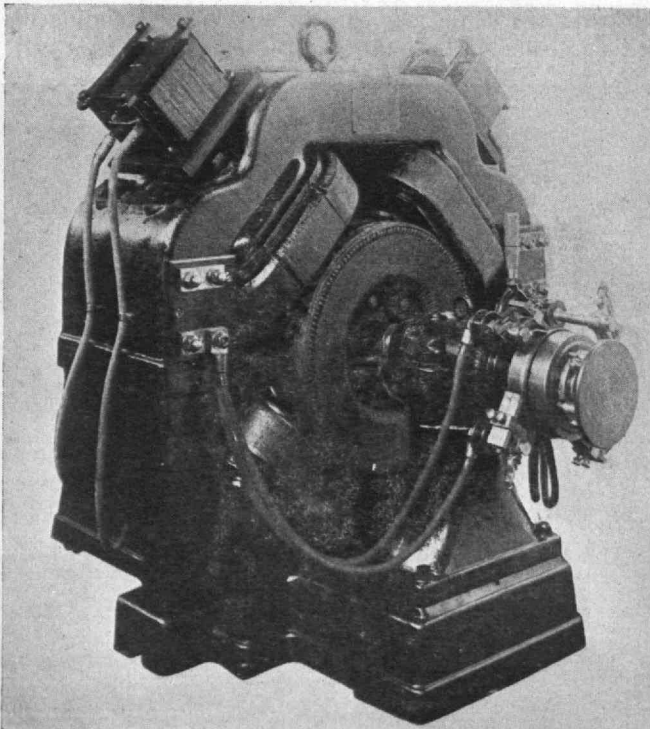
welders were going out to the wire mills, hardware makers, carriage builders, wheel and pulley manufacturers, and especially the chain and cable people. Links as large as two inches in diameter could be joined by a machine which Lemp designed for the purpose. One of the most important early applications was the welding of the cables used to pull cars over the Brooklyn Bridge. And, undaunted by extremes, he built a tiny machine for welding gold wedding rings.

It was Lemp who gave Hiram Percy Maxim, '86, his start by hiring him as a draftsman. Maxim's father had invented the machine gun some time before, and Percy himself was much interested in ordnance. So when a proposal was made by the Army that a new type of armor-piercing shell be made with a hardened steel point welded to a soft body, Percy Maxim was put in charge of a special plant to make them.

By all odds the biggest welding opportunity of those days was the joining of streetcar rails to make a perfect electric circuit and eliminate noisy rail joints. The company had put out a machine to be wheeled along the track, operating on the direct current from the trolley wire itself. But, as welding was done with alternating current of pressure of a volt or two, it was necessary to include a motor-generator unit to make the conversion. This not only gave much trouble but was bulky and expensive.

While struggling with this problem, Lemp happened to read a German article describing a novel type of engine-driven Schuckert dynamo, which had the usual direct-current commutator on one end of the shaft and alternating-current slip rings on the other. Either kind of current could be delivered, as application demanded. Thinking it over, Lemp wondered what would happen if the engine were dispensed with and direct current were fed into one end of the machine. Could alternating current be drawn from the other? That is, would the machine function as a rotating switch?

Taking a standard direct-current dynamo from factory stock, he made the necessary changes in connections and found the idea worked perfectly. (Continued on page 436)



The first rotary converter for electric resistance railway welding, one of Mr. Lemp's most important contributions

ORGANIZED RESEARCH—

British Industry and Research

The Science That Directs Skilled Craftsmen Will Be of Greater Importance Than Ever After the War

BY SIR HAROLD HARTLEY

THE prosperity of Britain after the war will depend more than ever before upon the efficiency and progressiveness of our industries. The loss of our foreign investments and the possible diminution of the payments to us from abroad for services rendered will necessitate a considerable expansion in the value of our exports if we are to increase or even maintain our standard of living. Furthermore, this increase in exports will have to be brought about despite the industrialization of other countries which before the war were mainly producers of raw materials. Success can be won only if British products are better, more attractive, or cheaper than those made by our competitors or in our customers' own countries.

Similarly in the home market, our own products must hold their own, and we must make the most of the limited range of our native raw materials.

This formidable task can be achieved only if we use to the full our inventiveness and technical skill both to increase the efficiency of our older industries and to develop new commodities which will hold their own in the markets of the world. In the Nineteenth Century our natural genius and craftsmanship gave us industrial supremacy, but we were then cultivating a virgin field and, until the close of the century, we had few competitors. Now the position is very different, not merely because of the growth of industry abroad but because the easy inventions and obvious developments have already been made. Nature now yields her further secrets only as a result of much more prolonged and careful searching. Haphazard inquiry must be replaced by organized and systematic study.

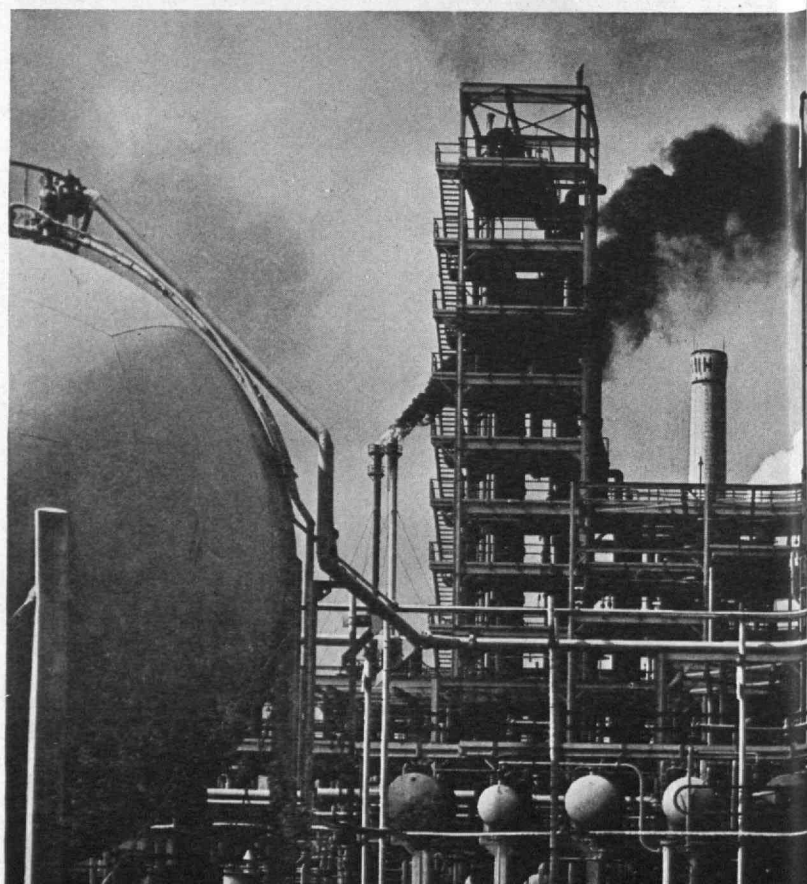
Only research can refashion existing industries effectively and create new ones. Developments sometimes occur with surprising rapidity, as was true with radio and rayon, and everyone knows the remarkable scientific developments, such as radiolocation, which have occurred under the stress of war. There is no reason why the post-war problems of industry should not equally be solved by scientific research, provided it is adequately supported. In the future the advantages Britain possesses in the skill and traditions of her craftsmen will depend more and more on the science that directs their efforts. Labor and research must work hand in hand.

Germany and the United States are usually cited as outstanding examples of countries which have utilized the services of science in the development of industry to a far greater extent than have we in Great Britain. Direct comparisons are difficult and misleading in that much valuable work has been done in the industries of this country

without its being specifically termed "industrial research," whereas Germany, and particularly the United States, have given greater prominence and publicity to their industrial research activities, which they have recognized as possessing a definite sales appeal. Nevertheless, despite some outstanding exceptions, in Britain there has not been a general appreciation of the value of science in industry, and the amounts spent on research have been correspondingly less.

The published figures of expenditure upon research in America show that the amount spent by that country in 1940 ran into hundreds of millions of dollars. Figures for wartime expenditure on research in this country are not available, but a study of pre-war expenditure by both countries shows without question that this country spent nothing like enough in comparison with the United States.

The greater use which the United States make of scientific knowledge is strikingly reflected in the character of their exports which, to a far greater extent than the exports of this country, are the result of modern invention and design. It is important to emphasize that these contrasts are in no way due to any lower standing of British science. In both the world (*Continued on page 438*)



PROMISE AND PROCESS

The Little Red Schoolhouse

Lessons Learned in the Administering of Sponsored Research for War Will Be of Great Usefulness in Peace

BY JAMES R. KILLIAN, JR.

THE wartime activity of an institution such as M.I.T. is so extraordinarily different from the conventional activities of a college as to make comparison with the little red schoolhouse entirely appropriate. That schoolhouse, legend at least would have us believe, was a human beehive, with something new happening every minute. So it is with the Institute in the war, and so it bids to continue. Undertaking duties new and strange to an educational institution, we have experienced nearly a fivefold increase in staff during the past three years, our expenditures have risen from some \$4,000,000 a year to nearly \$30,000,000, our peak enrollment has been 50 per cent greater than normal.

It is well worth while to examine some of the fiscal and organizational aspects of this war research program, for from them we may well draw conclusions which will be useful in postwar activities. Sponsored research at Technology is now primarily a government affair; in years to come it will once more be chiefly an undertaking of industry and the Institute, and on a modest basis rather than the great scale now necessary. The present greater volume and intensity of the research program have provided an extremely valuable opportunity for

the development of techniques of administration and control which should be of especial validity and importance in the planning of future programs at the Institute. The government and the Institute have learned together; the lessons will be useful to industry and the Institute.

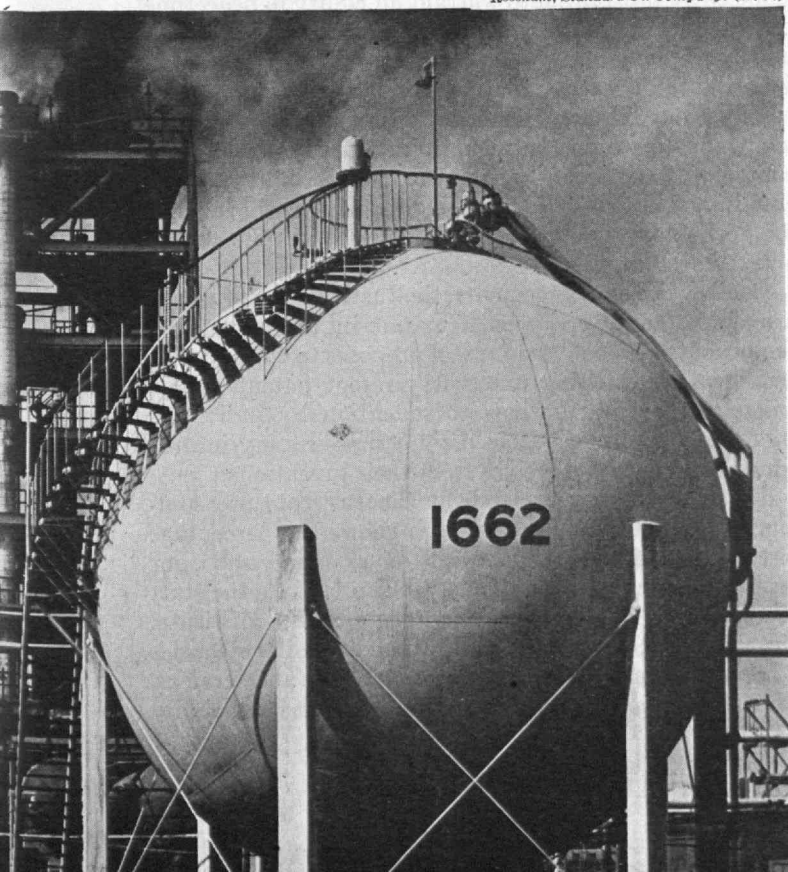
To begin, we should go back to the year 1940, which already seems very long ago and the events of which have already become difficult to reconstruct. It had been increasingly obvious for many months that war was almost certain for the United States, and this fact prompted several administrative moves at the Institute in the spring of 1940, designed to mobilize our efforts most effectively. One of the first things that we undertook was a census of Technology Alumni so that we should be prepared to meet demands for men trained in specific fields. Our second move was to take inventory of facilities and personnel at the Institute to determine what we had available and could most effectively offer to meet the scientific needs of the emergency. The catalogue of projects and programs compiled at that time was a good long-range forecast of what we have actually undertaken.

I cite these preliminary moves to show that we were not playing a passive role in the pre-war days. Of more importance, we possessed a teaching staff of capacity and versatility who were willing to be bold in action and public spirited to a fault in undertaking more research on the top of heavier teaching loads. Milton's famous sentence defining education aptly suggests the attributes of this staff: "I call therefore a complete and generous education that which fits a man to perform justly, skilfully and magnanimously all the offices both private and public, of peace and war."

The modest dimensions of our research program for outside agencies in those pre-war days are interesting to recall. The Division of Industrial Coöperation in the fiscal year ending June 30, 1940, had some 36 active contracts, involving an expenditure of the order of \$100,000 for the year, compared with our 1944 program which involves 189 contracts with a total expenditure which may run to \$25,000,000.

It was in November, 1940, that we first heard about a new project of the National Defense Research Committee, later to be known under the ambiguously informative title of "radiation." Efforts had been made in several places in and about Washington to find housing for this new project, and finally the Institute was asked if it

Roskam, Standard Oil Company. (N. J.)



Embodiment of industrial research is this low-pressure cracking unit of a petroleum plant in Baton Rouge.

might squeeze out some 11,000 square feet of space to give the projected research a local habitation and a name. I well remember the difficulties we had in justifying the commandeering of this much space for an outside project and our naïve assumption that this would probably be the maximum amount of space we could make available. Naïve indeed when we now look about us. The project occupies in excess of 15 acres.

By the time the shooting actually started, the number of outside sponsored research projects at the Institute had increased to 80 and we had made a fast start in mobilizing our maximum facilities. For the projects that were started in the fall of 1940 and the winter of 1941, we did not have a single completed contract until late spring. We did not stand upon the order of contracts but went to work at once. Ways and means could be found later.

One of the reasons why contracts took so long for completion was that both the Institute and the government had to learn how to draw contracts to cover this type of work. A policy on patents, for example, had to be formulated, and many months were required to reach general agreement. More importantly, a formula for reimbursement had to be found which would apply to the special conditions obtaining in nonprofit, charitable foundations, such as educational institutions. The chairman of the National Defense Research Committee had quite properly enunciated the idea that educational institutions should undertake government research on a no-profit, no-loss basis and the institutions themselves readily agreed that this was proper. In practice, however, difficulty was encountered in defining in precise accounting terms what is meant by no profit, no loss.

I think it is true that however long contracts were delayed and however frequently we started or actually completed projects before even receiving letters of intent, there has not yet been a case where we have not ultimately been able to obtain reimbursement from the government. We have found the government's contracting officers fair, reasonable, and competent. We have tried to meet them with complete candor with respect to our costs and procedures.

Prior to the war, the total number of employees at the Institute totaled approximately 1,100, of whom about 600 were staff members and the remainder other types of employees. The latest census indicates that the Institute now has approximately 5,000 employees, of whom 1,800 are professional staff. This growth of personnel has brought about problems of management new to the Institute, and we have had to devise administrative procedures for meeting them. With such an expanding personnel, problems of salary and wage policy have grown and extensive personnel services have been organized to handle them. A year ago, President Compton appointed a committee of the Corporation to review our salary and wage policies, particularly as they affected the Radiation Laboratory. The committee approved the general salary levels and policies in effect, making recommendations as to changes in details but not in over-all policy. We had previously established a joint wage board to co-ordinate the wage and nonstaff policy of the Institute proper, the Radiation Laboratory, the Chemical Warfare Service, and the Division of Industrial Coöperation. Its work had been so effective that the committee of the Corporation recommended a similar board for the co-ordination of salary policy in the various major divisions of the institu-

tion. At the present time, basic salary scales are established for all war projects and no departures are made therefrom without the approval of this salary board.

We likewise have found it necessary to provide a new method for handling patents. The well-established Faculty Committee on Patent Policy has concerned itself primarily with questions of invention and equity involving members of the staff. This work it continues to do. Matters, however, having to do with the financial aspects of inventions and of contractual arrangements with the government and licensees are now handled by a Patent Management Committee.

The patent policy which has been adopted to meet the special conditions surrounding war patents conforms to the distinctions of the patent clauses in our war contracts, of which the "short form" renders all patent rights assignable to the government and the "long form" permits the contractor to file an application if it chooses, granting a nonexclusive, royalty-free license to the government for use for military, naval, and national defense purposes.

If, however, the government disclaims any interest in an invention which arises in work being done under a short-form contract, the Institute determines first whether it wishes to file an application. If it does, it then seeks to establish a mechanism whereby any income received from the patent will be distributed among the educational institutions which have lent personnel to the laboratory doing the work, in accordance with the proportion of representation of the institutions. If the government and the Institute both elect not to file, the institution from which the inventor is on leave has the privilege of filing and prosecuting the application at its own expense, and enjoys the entire right, title, and interest in any patents resulting.

In handling inventions which arise under the long-form patent clause and upon which the Institute elects to file for letters patent, we are guided by the following principles: We will file only on those inventions to which the Institute and its own staff have made a contribution sufficiently substantial to warrant an equity in peacetime patent uses. Regardless of the Institute rights set forth under the long-form patent clause, M.I.T. will waive such rights on patentable inventions which have arisen wholly from research financed entirely by the government and to which the regular Institute staff have not contributed significantly. Any income derived from patents in accord with the foregoing principles will be used by Technology solely for the support of its educational and research programs.

In all of these arrangements, the Institute reaffirms the principle of appropriate participation by the inventor in the benefits of his invention and proposes to continue the arrangements existing under its present patent policy, whereby the contributions to invention by individual staff members are recognized by a share in any income which the Institute receives from their inventions.

The costs of war research at the Institute are summarily presented in Fig. 1, which shows the percentage distribution of the war research dollar based upon our complete cumulative total of expenditures since the start of the war and including all projects at the Institute. Notable is the small amount of expenditure in categories other than salaries and wages, and materials and services. The astonishingly low percentage that has gone into

overhead is effected by the inclusion of the Radiation Laboratory in this total and by the fact that this overhead is a percentage of total expenditures and not of labor. Actually we find that our overhead costs on government contracts other than Radiation run at least 50 per cent of labor. In the large Radiation Laboratory project we have been able to transfer many types of overhead costs to direct expenses met by the government, and this transfer is reflected in the low percentage shown in the chart.

There seems to be some general misconception about the nature of this overhead and its effect upon the Institute budget. Under the principle of no profit and no loss, the overhead allowance which we receive has been calculated to reimburse the Institute for those types of necessary expenses which are not directly chargeable to the government but which nevertheless are actual expenses incurred by the institution. The overhead income received on government contracts is *not* a surplus and is not contributing toward any reserve against which we can draw for other expenses. In fact, all the income on government research goes directly into the Institute's operating income to aid in balancing our over-all budget. We have been much concerned about how to arrive at an overhead allowance that leaves us without loss or profit, a rather metaphysical concept which has perplexed auditors and accountants accustomed to dealing with profit-making enterprises.

In effect, the system of evaluation which has been developed results in the sponsored research's carrying its proportional share of all the Institute's overhead, and this is apparently coming to be accepted as a proper definition of no profit, no loss. Our contracts specify an overhead allowance equal to a fixed percentage of labor costs. In our relations with the Office of Scientific Research and Development, a maximum overhead on all contracts is agreed upon each year.

With the annual expenditure for war research running close to the Institute's total resources of endowment and funds, an error in determining this overhead on the red side of the ledger might, however small in percentage, seriously affect the Institute's financial stability. We now feel that we can avoid any such errors, but there remains one hazard that no one has so far been able to define, and that is the expense or liability which may arise after terminations of the contracts and which cannot be anticipated at present. An example would be that years hence the General Accounting Office might decide that some types of expenditure under these contracts were improper and we should be called upon to make reimbursement to the government. We have no defense against this kind of future contingency. At least, no way has at present been found to permit colleges contracting with the government to set up any reserves against such a hazard. It is also possible that our charges for maintenance and operation may be inadequate to cover the depreciation which is going on at the present time in our equipment and buildings.

AS I have suggested, industry was beginning to turn to the Institute to an increasing extent before the war for the solution of fundamental industrial research problems. This trend will probably be accelerated after the war as a result of our record in war research and further as a result of the growing belief on the part of

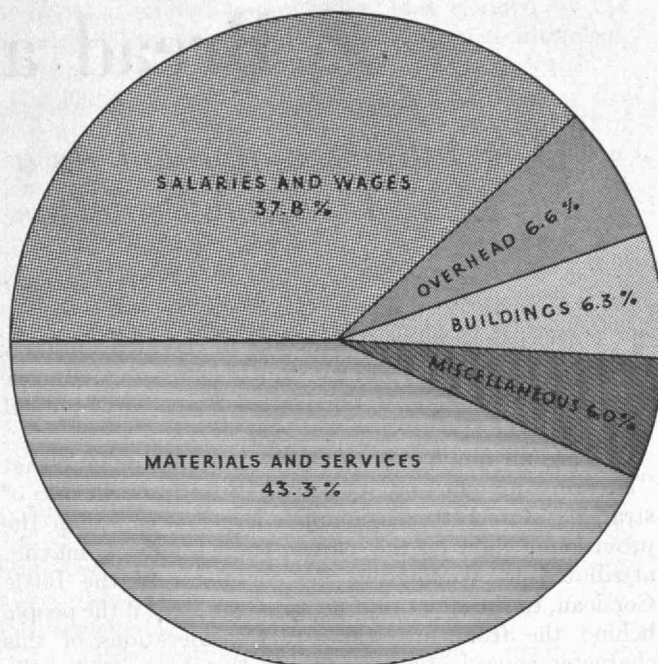


Fig. 1. Percentage distribution of the war research dollar at M.I.T. for the period ending June 30, 1944 (1943-1944 estimated)

industry in the efficacy and necessity of fundamental research. The experience which we have gained during the war will stand us in good stead in handling such research when it comes. The volume, of course, will be and should be small compared with the present war program. We shall want to return to a program that bears some reasonable relationship to our educational activities, and not to go beyond this point.

Institutions no less than living organisms probably have some optimum size beyond which they cannot go without unfortunate results. Birds, as J. B. S. Haldane points out, can fly and soar efficiently; but an angel aspiring to similar flight, and with muscles developing no more power weight for weight than a bird's, would require a breast projecting about four feet to house the muscles engaged in working its wings — not a comely prospect for an institution accustomed to free flight.

We have been trying to clarify our philosophy in regard to research undertaken by contract. In line with this objective we have studied a new type of organization that seems to be spreading rapidly among American college institutions, the so-called research foundation. Many institutions are setting up separate corporations to hold patents and to deal with industry in handling contracts for research. The Wisconsin Alumni Research Foundation is an example of a patent-holding corporation, and the Purdue Research Foundation is a good example of a corporation acting to promote industrial research as well as to hold patents.

The establishment of many of these foundations has resulted mainly from restrictions circumscribing the activities of the universities and making it difficult or impossible for them to contract with industry or to make a profit or to benefit financially from research. In the main, the institutions so restricted are state institutions. Another objective in establishing the foundations has been to centralize research relationships with industry and to establish uniform research policies among the various schools and departments (*Continued on page 444*)

Bread and Battle

The Influence of Food As a Factor in the Civil War Offers Light on Problems to Be Expected Today

BY GEORGE FORT MILTON

FOOD is a weapon. This axiom of the great military commanders has had constantly increasing influence upon the policy of the United States Government in World War II.

We are all familiar with the Napoleonic remark that "an army marches on its belly." But this principle of strategic statecraft has a much larger sweep than the provision of chow for the soldier. There is another maxim, attributed to Wellington, the conqueror of the Little Corsican, to the effect that no army can fight if the people behind the front are starving. Considerations of this character caused our government to set up, under the Department of State, an Office of Foreign Relief and Rehabilitation Operations to see to it that no such threat might lurk in the rear when our armies land on the coasts of Europe. Therefore practical as well as humanitarian considerations joined in leading Herbert H. Lehman to resign as governor of New York to become director of this new agency, which has subsequently been made part of the Foreign Economic Administration.

Food has been a weapon in nearly every American conflict, but in none so conspicuously as the Civil War, in which the achievements of the farmers of the loyal states not only fed both soldiers and civilians but also furnished exports which were indispensable to the financing of the war. There was an extraordinary record of increased production, which may throw light on problems of today.

Even before Beauregard's guns opened on Sumter, the secession of the cotton states had confronted the truncated Federal Union with a heavy financial problem. Theretofore, the nation's chief exports with which to meet the heavily adverse trade balance had been cotton and tobacco. No longer would these be available, and the Lincoln administration hoped against hope that some prairie farm products could be sent abroad in greatly increased quantities to command the necessary foreign funds. Could this be done?

The new Confederate States of America had an equally difficult but quite different sort of agricultural dilemma. For half a century, Dixie's agriculture had been geared to the production of staple crops for export, either to Europe or to the manufacturing and processing centers north of the Potomac and the Ohio. At first, President Davis and his chief political advisers lived in a world of illusion. They advanced the thesis that "cotton is king"; the spinners and weavers of Manchester, Lille, and Chemnitz would starve unless the South's fleecy staple continued to flow to them.

The Davis government had only to forbid export of cotton, therefore, to force Britain and France to recognize the independence of the Confederacy, break the Federal blockade, and bring victory to the Southern cause. Davis installed the embargo and persisted along this path of folly for more than a year. Not until the fall

of 1862 did the Confederate authorities put their weight behind blockade-running. At the same time, and out of sheer necessity, they sought to effect a partial conversion of the South's agricultural habits from cotton and tobacco to food and feed for military and civilian needs.

THE agricultural conversions in the North and South, while largely coincident in time, were different in purpose and in accomplishment. The difference between them stemmed out of the contrasting paths of agricultural development, with its resulting discrepancies of social attitudes.

Between the time that Eli Whitney's gin had enthroned King Cotton, and the great secession over 60 years later, cotton fundamentally conditioned the South's economic structure. This was because the Southern planters believed that it afforded the only agricultural production to which slave labor could be profitably devoted. This result had been reached by a process of trial and error extending over many years. In the beginning, slavery had been an experience common to the American colonies. All of them had found that if slavery were to pay, three things were necessary: The slaves must be put to tasks requiring only simple techniques; they must be worked in groups or gangs in order that the cost of supervision could be kept low; and, finally, they must be kept busy for most of the year to reduce the time the owner would need to keep them in idleness. If these conditions could not be met, slave labor would cost more than free labor.

The climate in the Northern colonies lent itself to none of these three requirements. Slavery there proved unprofitable and was given up. In the Eighteenth Century, until after the Revolution, the planters of Maryland, Virginia, and North Carolina thought such characteristics existed in tobacco culture; but by the time of the establishment of the new Union, tobacco profits were falling off. With decreasing success, South Carolina had sought to adapt slave labor successively to the growing of indigo, tea, and rice. But Whitney's gin presented the slave-owner with a specific agricultural technique which met all three of the conditions under which slave labor could be made to pay. It made cotton growing immediately and immensely profitable. It dominated Southern economic and social attitudes, and channeled the change in the state of the arts in the Dixie states.

This Southern concentration on cotton growing gave a shock to the general American development. Until it began, there had been a substantial homogeneity among the original 13 states. Two dominant American traits had manifested themselves in Southern as well as Northern states: a genius in the organization of economic and social processes, and an uncanny ability among the people, confronted with some immediate problem, to improvise a solution and apply it.

These traits, which might be termed a social function of the Anglo-Saxon settler's problem of terrain, enabled him to meet the challenges of his new physical environment. All the seaboard states had relatively scant populations, who had to manipulate an unwieldy mass of area and subordinate it to man. All were confronted with the problems of distance, transport, and communication. All must discover or invent the apparatus of government for great territories. All must break the Appalachian barrier, spoliage the Indian lands, fell the forests, subdue the land to agriculture, and supplement the production of raw materials with processing and manufacturing activities. These challenges to action developed the vital American trait of organizing large areas into a common pattern for similar service.

But when cotton became king, the South's further expansion westward was for the specific purpose of subordinating new areas to the old pattern of cotton culture. The Southern planter organized for cotton culture by slaves and set up the methods for its control. But once he had done this, he was cold to agricultural diversification, new plantation techniques, and new methods of labor organization and control. The South's expansion involved forcing new areas into old molds, and from 1820 to the Civil War, the main patterns of Southern agriculture as well as her economy in general were frozen and unyielding. This was true despite the scientific agricultural work of Edmund Ruffin in Virginia, the attempts of James D. B. DeBow to portray the dangers of one-crop economy, and Hinton R. Helper's warnings of impending trouble. It took the Civil War itself, with the South's resultant loss of foreign markets for cotton and tobacco, to bring amendment.

In contrast, the westward march of the peoples of the North gave a continuing development to the earlier national traits of organization and improvisation. North of the Ohio, the moving edge of civilization was flexible and adaptable to the condition of the immediate spot. The North's expansion invited the adaptation of life to the prairies and then the plains.

The census figures for the year of secession testify to the effect of these different development patterns. The area of land within the 22 loyal states (exclusive of territories)

was about a million square miles; that claimed by the Confederate States over 750,000. Land under cultivation was in greater contrast: 105,000,000 acres in the North, to 57,000,000 in the South. The estimated cash value of the South's cultivated land was only a little over a third of the almost five billion dollars put on that of the North.

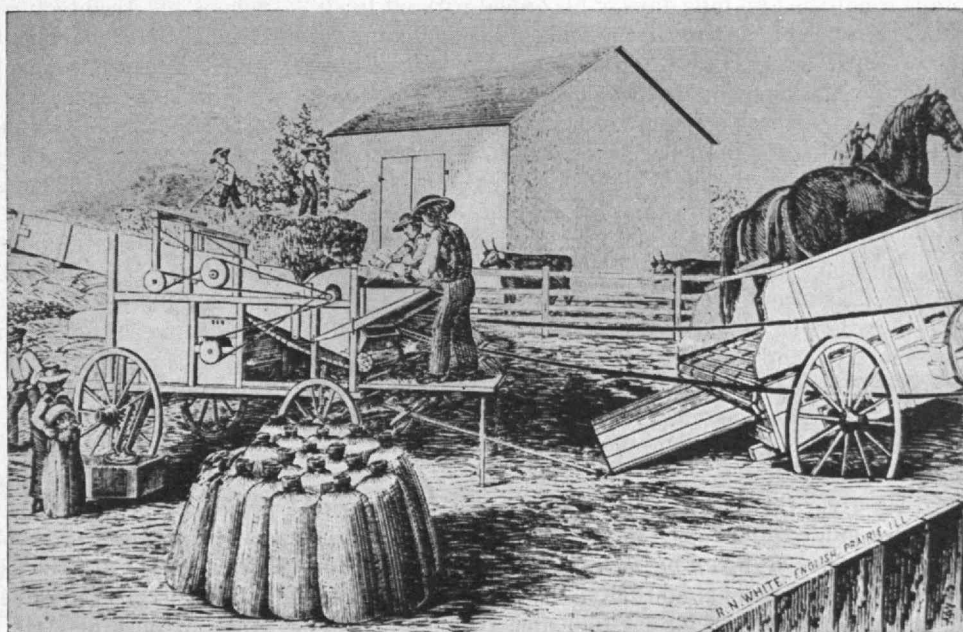
The record of farm crop productions is quite as significant. In 1839, the nation's total wheat yield had been but 84,000,000 bushels. Throughout the Forties and the Fifties the swift westward movement of the pioneers had put tens of thousands more prairie acres to the plow, and 1859's wheat yield was more than double — 173,000,000 bushels. In these two decades the corn production almost trebled, from 317,000,000 to 838,000,000 bushels. But as the totals went up, the border and southern states' share in them kept declining. In the earlier year, Tennessee's corn yield had exceeded that of Illinois; 20 years later it was but a third of it. When the Civil War broke out, the seceded states produced but a third of the nation's total grain yield — so little, in fact, that they were having to import wheat, corn, and other grains to make up food and feed deficiencies.

The South's cotton economy contained within itself the seeds of disaster, and these were sown in the very first year of the war. No sooner had the Confederate Government established itself in Richmond than Jefferson Davis put cotton exports under the Confederate ban.

For a period of several months, before the Federals had much more than a paper blockade, the South had the physical opportunity to ship abroad to depots of deposit in Britain, France, and the Low Countries hundreds of thousands of bales of cotton, which would then have been available for credit or cash for purchases overseas. But, with exemplary fatuity, the Davis government impounded the cotton at home and even raised strenuous objections to the shipment to England and France of bales already purchased and paid for by buyers overseas. By the fall of 1861, the blockade had become a reality, and the Confederate chance for unimpeded export was at an end.

The Southern "fire-eaters" had theorized that the blockaders really were allies of Dixie, because anything that kept cotton from the mills (*Continued on page 446*)

Beginnings of mechanization in American agriculture were another application of horsepower, as in this early J. I. Casethresher, which was first put on the market shortly before the Civil War.



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THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE



Official photo, United States Army Air Forces

Welcomed into the Caterpillar Club by Lieutenant Colonel Roger Q. Williams, famous trans-Atlantic flier, Lieutenant Leon Crane, '41, on his return to Ladd Field, Fairbanks, Alaska, after 84 days in the wilderness, points out the region over which he was forced to bail out of a disabled Liberator bomber.

Safe and Sound

OUT of the subarctic Alaskan wilds safe and sound on March 14 came Leon Crane, '41, returning to Ladd Field, Fairbanks, Alaska, after a period of almost three months from the day when he bailed out of a disabled Liberator bomber. Disappearing in a snowstorm high above the Alaskan mountains just before Christmas, he and four others of the crew of the craft of which he was copilot were given up for dead on January 8. Wide-ranging organized search by their comrades in the Alaskan wing, Air Transport Command, had failed to reveal a trace of the lost plane or its crew. Lieutenant Crane spent the first nine days of his ordeal without food, huddling much of the time in the folds of his parachute to keep from freezing. His 84-day stretch is the longest any flier of the Alaskan wing has been lost and come out alive.

Crane's plane took off from Ladd Field at Fairbanks on December 21 on a propeller test mission. Trouble with the craft, in which the flight indicators went out and one of the outboard engines gave way, sending the plane into a spin, led to orders to bail out. Parachuting down, Crane heard the plane explode when it hit the ground. He landed an estimated 10 miles away from where the plane struck. Following a stream, he holed up on its bank for the first lonesome days and thereafter traveled until he came on a small cabin used by a watchman, where there was a cache of food. Here he stayed alone for about three weeks, and then decided on a do-or-die effort to reach the outside rather than wait for the spring breakup of ice. Pushing on down the river trail, he at length encountered a trapper who later guided him to the mining camp of Woodchopper, whence he was flown back to Ladd Field. He arrived there in good physical condition, and went to work helping in a renewed search for the four men still missing.

A native of Philadelphia, Lieutenant Crane was graduated from Course XVI, having been a member of the senior and junior honors groups. He was a member of the Aeronautical Engineering Society during his undergraduate years at Technology, and of the Coast Artillery unit of the advanced Reserve Officers' Training Corps.

Retirements

THE retirement of four prominent members of the Faculty, effective at the end of the academic year on July 1, has been announced by President Compton. They are Professor Walter R. MacCormack, '03, Dean of the School of Architecture; Professor Ernest F. Langley, Head of the Department of Modern Languages; Professor Floyd E. Armstrong of the Department of Economics and Social Science; and Roy G. Burnham, '00, instructor in the Section of Graphics.

Dean MacCormack became head of the School of Architecture in 1939 upon the retirement of Dean William Emerson. He has been appointed an honorary lecturer, and after his retirement he will devote himself to a continuation of his activities for postwar reconstruction and the development of a national policy for training architects to meet the exacting demands of the future. Dean MacCormack is widely known as an authority on the design of school and college buildings. As a member of the board of education of Cleveland, Ohio, some years ago, he participated in the development of a \$40,000,000 school building program, and another of his important projects was the southern school building and industrial college program of the Julius Rosenwald Fund. Early in his career Dean MacCormack was associated with Guy Lowell, '94, in the development of plans for the Boston Museum of Fine Arts. Thereafter, he was engaged by

the Worcester Art Museum for the preparation of a program and preliminary plans for the museum building in that city. He has designed school and college buildings in Illinois, Ohio, Virginia, Kentucky, and Connecticut. Since 1930 he has devoted himself principally to housing problems, and an example of his work in this field is Cleveland Homes, Inc., a public-works slum-clearance project in Cleveland, Ohio. In 1932 he was a member of the committee on large-scale housing at President Hoover's Conference on Home Building and Home Ownership, and in 1936 he was appointed by the board of education in New York City to make recommendations for improvement in the planning, design, and construction of school buildings in New York City. He is a member of the United States Chamber of Commerce, and in 1943 he was re-elected vice-president of the American Institute of Architects. The Royal Institute of British Architects in 1941 elected him an honorary corresponding member, one of the outstanding honors bestowed by British architects.

Dean MacCornack was educated at Knox Academy and Knox College at Galesburg, Ill., and was graduated from the Institute's School of Architecture in 1903. During his distinguished career he has contributed in many important ways to the education and training of architects. He has been a lecturer in architecture at various universities, and during his years in Cleveland he gave a course of lectures on professional practice at the Cleveland School of Architecture at Western Reserve University.

Professor Langley, who has been head of the Institute's Department of Modern Languages since 1930, is a native of Toronto, Canada. He was graduated from the University of Toronto in 1894, and in 1900 received the degree

of master of arts at Harvard, where in 1909 he was awarded the degree of doctor of philosophy. He also carried on advanced studies at the universities of Paris, Leipzig, and Heidelberg, and the Instituto di Studi Superiori in Florence. From 1896 to 1910 Professor Langley taught at Dartmouth College, as an instructor and then as an assistant professor. He joined the staff of the Institute in 1910 as professor of French. Between 1925 and 1930 he was a lecturer on romance languages at Harvard.

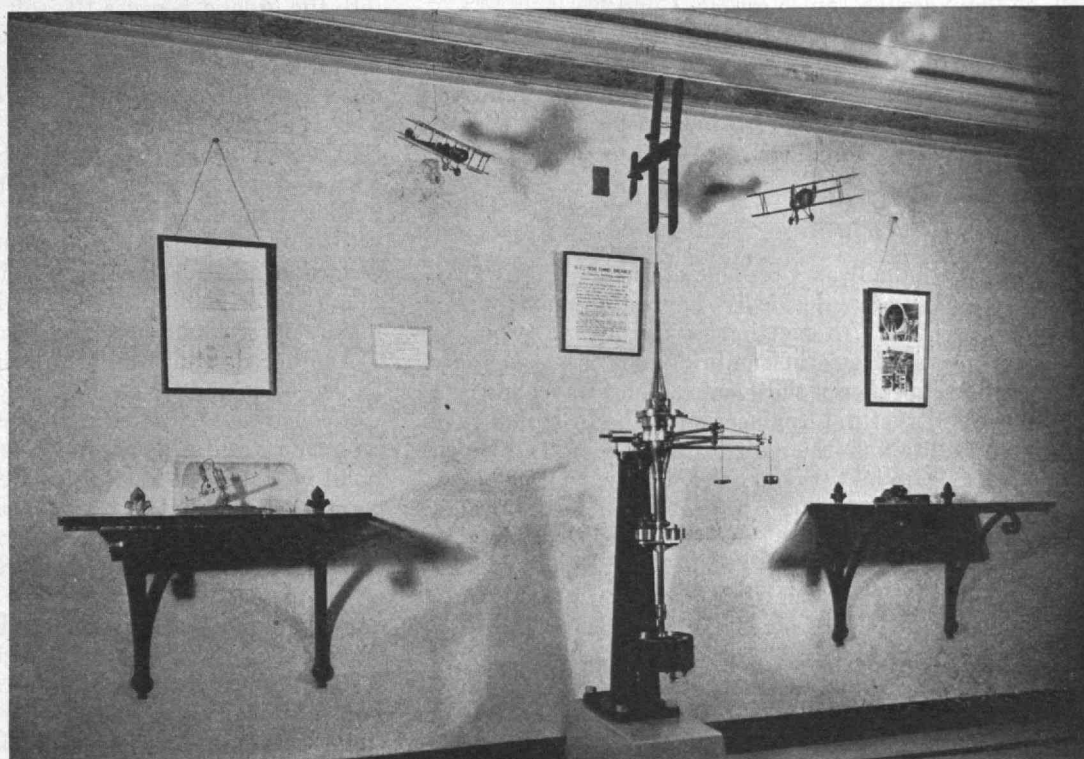
Professor Langley is a member of the Modern Language Association of America, the New England Modern Language Association, the Dante Society of America, Association of Teachers of Italian, Harvard Musical Association, the American Academy of Arts and Sciences, and Société des Textes Français Modernes, Paris. In 1937 he was elected president of the M.I.T. branch of the American Association of University Professors. He is the author of *The Extant Repertory of the Early Sicilian Poets*, and has edited many other works.

A native of Michigan, Professor Armstrong was educated at the public schools of Gladwin and at Bay City High School. He taught for three years in rural schools and served for two years in the grade school at Gladwin. For eight years he was country school superintendent in charge of rural schools and superintendent of the Gladwin public schools.

In 1911 Professor Armstrong entered the Michigan State Normal College, and the following year transferred to the University of Michigan, from which he received the degree of bachelor of arts in 1914 and his master's degree in 1916. While carrying on his graduate work in economics and law, he served as an instructor in economics. He joined the staff of the Institute in 1916 as an assistant professor, was promoted to associate professor of

In the center of this portion of the aviation collection displayed in the Union Trust office of the State Street Trust Company in Boston is the wind tunnel balance designed by the National Physical Laboratory, Teddington, England—the first accurate testing machine of its kind used in this country, which was in operation in the four-foot wind tunnel at the Institute from 1914 to 1925. Many of the data for American planes in the first World War were

computed on this instrument. Directly above it is a scale model of the DeHavilland 4 of that war, mounted in the position in which it was tested on the balance. To the left of that model is a scale model of the Vought VE-7 of 1917, which was tested on the balance. This was the forerunner of the present Vought-Sikorsky Corsair, reputed to be the fastest carrier-based fighter in the world. The other test model is of a "high-speed" fighter plane calculated for 100 miles an hour, which was designed as an undergraduate problem in aeronautical engineering at the Institute in 1917.



Cushing-Gellatly

political economy in 1919, and became professor in 1926. He has lectured at Boston, Harvard, and Northeastern universities. In 1929 he was granted a leave of absence for a year for travel around the world.

Mr. Burnham, a native of Essex, Mass., was graduated from the Institute with the degree of bachelor of science in 1900. He joined the staff of the Institute in the Department of Mechanical Engineering in 1902 as an assistant and became an instructor in mechanical engineering drawing in 1904, serving to 1935, when he was appointed an instructor in drawing in the Section of Graphics. Mr. Burnham has served as a member of the teaching staff of the Lowell Institute School for 40 years and has also been an examining aid to the civil service commissioner of Massachusetts.

Reunions in 1944

THE gatherings which they held in connection with Alumni Day on February 26 were the only reunion events thus far planned for this year by the Classes of 1884, 1889, 1899, 1909, 1924, 1929, and 1939.

The annual Webster dinner of the Class of 1888 will be held in June at a place and on a date later to be announced.

The 50th anniversary of the Class of 1894 will be observed at the New Ocean House in Swampscott from Friday, June 9, to Sunday, June 11, inclusive.

Final decision on a June reunion has not as yet been made by the Class of 1904.

The Class of 1914 will meet from May 26 to May 28 at the Westchester Country Club, Rye, N. Y.

The 25th anniversary celebration of the Class of 1919 will be held from Friday, July 28, through Sunday, July 30, at the Norwich Inn, Norwich, Conn.

Saturday, June 3, and Sunday, June 4, will see the reunion of the Class of 1934 at a place in Connecticut which will be announced later by the reunion committee, which consists of Henry B. Backenstoss, Robert M. Becker, W. Leslie Doten, Jr., and John A. Hrones.

Not for Quixote

SUCH a windmill as Don Quixote never would have tilted at was a decidedly interesting part of the agenda for the 237th meeting of the Alumni Council, held at the Smith House in Cambridge on the last Monday in March. As speaker of the evening, John B. Wilbur, '26, Professor of Structural Engineering at the Institute, gave an illustrated talk on the Smith-Putnam wind turbine on Grandpa's Knob in Vermont. Dr. Wilbur, who has been closely connected with the project since its inception, showed films depicting the construction of the generator and described in vivid detail some of the problems which were encountered in erecting it. Developing 200 kilowatts in a 20-mile wind, the turbine has two blades totaling 175 feet in diameter, and mounted on a hub 120 feet above the ground. In a 30-mile wind, at which the generator reaches its rated capacity of 1,000 kilowatts, the rated speed of the blades is 28.7 revolutions per minute, which gives them a tip speed of about 200 miles an hour. Dr. Wilbur's close familiarity with the project gave his remarks special interest, and his generosity in answering questions at the close of his formal talk was thoroughly exploited.

Business of the meeting, which was called to order by Francis J. Chesterman, '05, President, included several reports, among which was that of Henry B. Kane, '24, Director of the Alumni Fund, recording 8,852 contributors and \$115,603.53 in contributions, an average of \$13.10, for the fourth year of the Alumni Fund, which closed on March 31. These figures represent substantial increases over the preceding year.

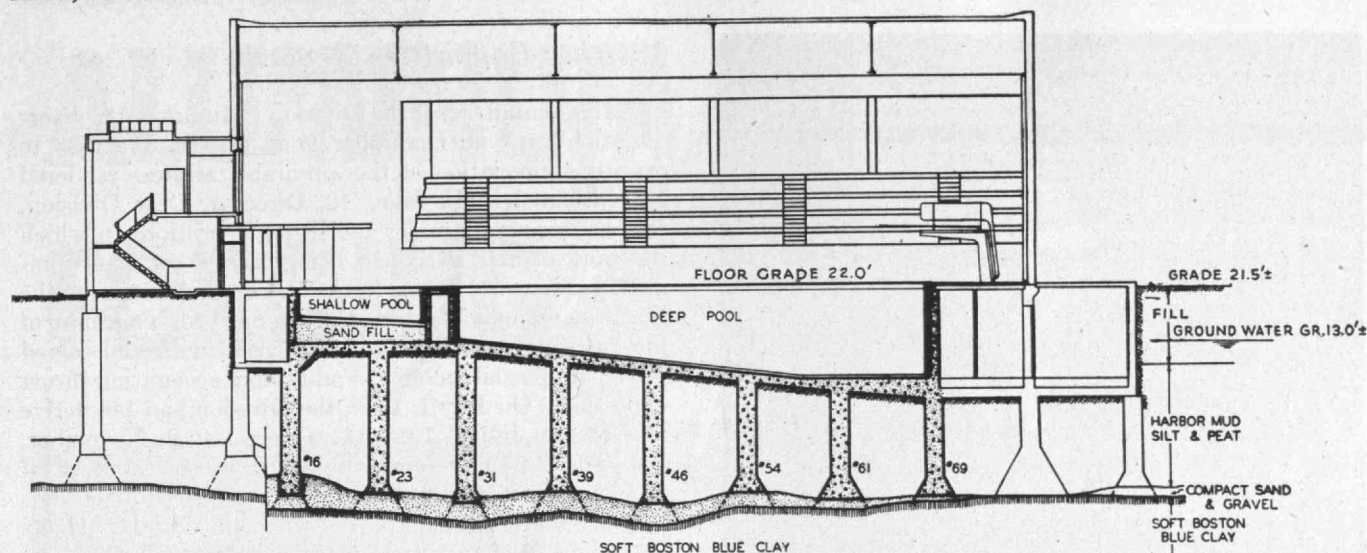
Resolutions in memory of Alfred S. Higgins, '78, prepared by a committee including Arthur G. Robbins, '86, George E. Russell, '00, and F. Alexander Magoun, '18, chairman, and resolutions in memory of Charles E. Greene, '10, prepared by a committee consisting of Herbert S. Cleverdon, '10, chairman, John A. Herlihy, '11, and George I. Chatfield, '28, were presented, being accepted by a silent rising vote.

The life of a Navy V-12 student was described by Cortlandt F. Ames, 3d, of the Class of 10-44, who was introduced by President Chesterman as the undergraduate speaker of the evening, continuing the plan of having some phase of undergraduate interests and activities discussed at each session of the Council. Mr. Ames told the story of a typical day at Technology in terms of the Navy unit, describing the different types of students involved and appraising the way in which different groups made the adjustment to the prescribed routine. His narrative was most interesting, and he evaluated the experience as satisfactory and profitable.

Smooth Settling

TECHNOLOGY Alumni still can get a chuckle out of the newspaper stories of some years ago which depicted the Institute's Cambridge home as swiftly sinking into the ground because the soft blue clay underlying it could not bear its weight. Settlements of as much as three inches had occurred by the time the construction of the main Institute group had been completed in 1916 and were the basis of many a rumor, one of which predicted that readers would live to see about half the first story disappear below ground. In spite of such forebodings, however, the buildings stand today as an example of a satisfactory foundation made under difficult foundation conditions. Settlements have varied considerably, from a minimum of about one inch at Buildings 1 and 3 to a maximum of about eight inches at Buildings 2 and 10.

Another difficult and interesting foundation problem had to be solved at the Institute when the Alumni Pool was constructed, and enough time has now elapsed for a report on results. Though of course this building is very small in comparison with the area covered by the main plant, proper foundations for it presented a special question for two unusual reasons — one a natural condition of the site, the other a particular requirement growing out of the purpose of the structure. The first is clear in the drawing accompanying this article; it is the fact that at one point in the area, to the right of caisson 69 in the sketch, the layer of sand and gravel overlying the soft Boston blue clay disappears, so that no dispersion of stress through the sand blanket is possible and the load is conveyed directly to the clay itself. The second requirement characteristic of swimming pools was that the foundations must be so designed that differential settlement should be at the minimum. Proper drainage of the pool curb and proper appearance of the scum gutter of



A longitudinal section through the Alumni Pool building, showing typical caissons and subsoil conditions. Thinning out of the sand strata over the soft clay at the eastern (right) end of the structure necessitated special design considerations planned to prevent differential settlements greater than one-quarter inch. This exacting requirement was imposed because of the special purpose of the building, principally because of the necessity of keeping the scum gutter of the swimming pool level.

the pool made this requirement necessary. Specifically, it was directed that differential settlements of the caissons supporting the pool should not exceed one-quarter inch—a far cry from the differential settlements of seven inches noted above for individual units of the main educational buildings.

Even with uniform foundation conditions free of horizontal variation, this requirement might have caused considerable concern; however, the variation in thickness of sand strata and the entire absence of sand at one point, which has been mentioned, added to the complication. The average depth of sand at the deep end of the pool was only about two feet; at the shallow end, it averaged seven feet. A tendency toward greater settlement at the deep end and a danger of differential settlements exceeding the small permissible tolerance were consequently indicated.

A special foundation design therefore was developed, which accepted the anticipated settlements at the deeper end of the pool and introduced the far from conventional procedure of increasing the settlements at the shallow end in order to give a uniform settlement of the pool as a whole. The design also involved the unconventional procedure of carrying some of the caissons below the surface of the sand strata, as indicated in the drawing for caissons 16 and 31. Caisson base sizes are commonly chosen so that the areas of loading at the clay are proportional to the caisson load; in this case the method used was in brief a choice giving diameters of loaded areas at the clay which are proportional to the caisson load. Since it is the compression of the clay that causes settlements, the load on the surface of the clay, not the load on the overlying sand; is the ruling factor.

Careful grades were established early in order to provide an accurate check on results. The average settlement in the three years since the grades were established is about 0.8 inch. The greatest differential settlement at the pool is 0.36 inch. Other differential settlements, however, are no more than 0.15 inch. The one instance of settlement which has exceeded the prescribed 0.25 inch is not visible to the eye and is dismissed as an isolated irregularity. The average differential between the two

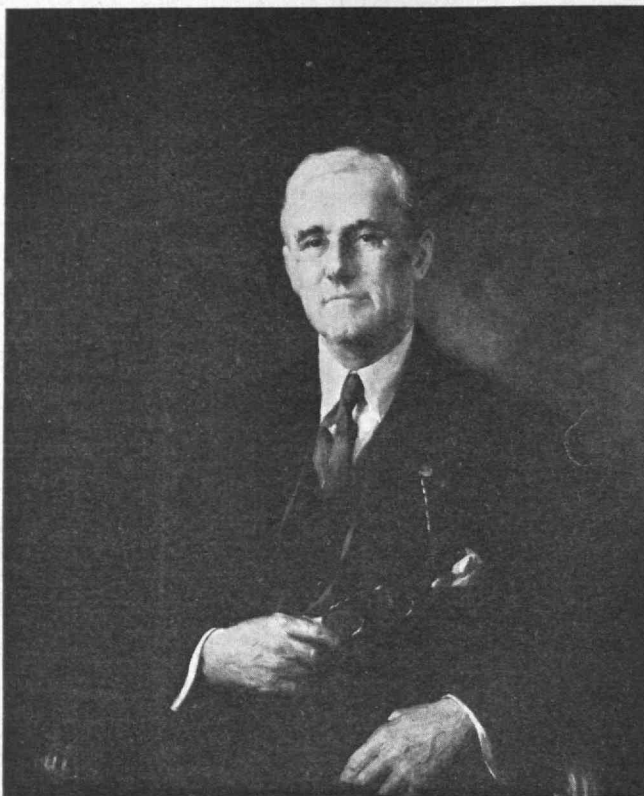
ends of the pool has been slightly greater than 0.1 inch in earlier readings, but in the latest series of observations is only 0.05 inch.

An alumni project in conception and financing, the Alumni Pool in design and construction was very much an Institute affair. Architects for the Alumni Pool were Lawrence B. Anderson, '30, Associate Professor of Architectural Design, and Herbert L. Beckwith, '26, Associate Professor of Architectural Design. Thomas R. Camp, '25, Associate Professor of Sanitary Engineering, contributed specialized skill to filtration, circulation, and other functions pertaining to the pool itself. The foundation problem was the work of Donald W. Taylor, '34, Assistant Professor of Soil Mechanics.

Promotions

NINE members of the Faculty are advanced to the rank of full professor in the list of Faculty promotions recently announced by President Compton. They are: Nathaniel H. Frank, '23, and Francis W. Sears, '20, Department of Physics; Martin J. Buerger, '24, and Walter H. Newhouse, '23, Department of Geology; Murray F. Gardner, '24, and Ernst A. Guillemin, '24, Department of Electrical Engineering; Edwin R. Gilliland, '33, Department of Chemical Engineering; George C. Manning, '20, Department of Naval Architecture and Marine Engineering; and Bernard E. Proctor, '23, Department of Biology and Biological Engineering.

Promoted to the rank of associate professor are: Harold A. Freeman, '31, and Paul A. Samuelson, Department of Economics and Social Science; James M. Austin, '41, Department of Meteorology; Arthur E. Fitzgerald, '31, and William H. Radford, '32, Department of Electrical Engineering; Peter E. Kyle, '39, Department of Mechanical Engineering; Norman Levinson, '33, and George P. Wadsworth, '30, Department of Mathematics; Augustus R. Rogowski, '28, Department of Aeronautical Engineering; Theodore Smith, Department of English and History; Donald W. Taylor, '34, Department of Civil and Sanitary Engineering; and Earle F. Watts, '20, Section of Graphics.



M. I. T. Photo

This portrait of the late William R. Kales, President of the Class of 1892 and long active in alumni and administrative affairs of the Institute, has been presented to Technology by his family. It is the work of Harold Brett.

Those advanced to the rank of assistant professor are: John E. Arnold, '40, Edward L. Bartholomew, Jr., '37, Frederick R. Evans, '41, Joseph Kaye, '34, and Deane Lent, '42, Department of Mechanical Engineering; Draveaux W. Bender, '33, School of Architecture; Karl W. Deutsch, Department of English and History; Andrew L. Johnson, '43, Department of Metallurgy; Walter C. Eberhard, '14, and Gerald Putnam, '23, Section of Graphics; Kurt S. Lion, Department of Biology and Biological Engineering; and George B. Thomas, Jr., Department of Mathematics.

A new appointment is that of Edward R. Van Driest, now a member of the staff of the University of Connecticut, who will join the Institute's Faculty as assistant professor of mechanical engineering. Professor Van Driest, who was graduated from the Case School of Applied Science in 1936, was awarded the master of science degree by the University of Iowa in 1937, and received his doctorate from the California Institute of Technology in 1940.

Members of the staff who will become instructors on July 1 are: Harrison E. Cramer, Leon F. Graves, and David B. Moyer, Department of Meteorology; John C. Fisher and Gardner M. Ketchum, '41, Department of Mechanical Engineering; and J. Rand McNally, Jr., '41, Department of Physics. Frederick H. Anderson of the Department of Mechanical Engineering has been promoted to the grade of technical instructor. Those who have been named research associates are: A. Nelson Dingle, Department of Meteorology; Stewart G. Fletcher, '43, Department of Metallurgy; and Richard E. Honig, '39, Department of Physics.

Visiting Committee Report

THE Committee on the Division of Industrial Cooperation* met on December 17 in Boston. We wish to express appreciation of the admirable services rendered by Nathaniel McL. Sage, '13, Director of the Division, and his assistants under the trying conditions in which the work of his Division is being carried on. The Committee also would like to express their appreciation of the excellent manner in which Horace S. Ford, Treasurer of the Institute, and his staff have coped with and solved the most unusual amount of additional accounting thrust upon them. On July 1, 1942, the Division had 144 active projects; on July 1, 1943, there were 149; in November, 182. The staff have continued their successful work of previous years and have made valuable contributions in war research. The nature of work under the contracts is tending to change from slow, fundamental studies to the practical and more rapid work incident to improvement of apparatus.

The importance of absolutely correct accounting and of scrupulous care in the handling of the large sums of government money incident to carrying out government contracts is recognized. A member of a firm of nationally known accountants is on full-time duty at the Institute and constantly available to the Division. At the present time various government auditors are auditing projects. This has been of real value to the Division because it has given our auditors and accountants valuable experience. Our own accountant also has been on duty continuously during the government audit. Differences developed to date are distinctly minor, but where differences have been found to exist, they will be satisfactorily adjusted.

The policy of M.I.T. has been not to reach out after research work but to approach whatever is offered, less as an opportunity than as an obligation and because the Institute has a specially trained staff peculiarly fitted for the particular work required. The Institute's policy is to accept projects when there is evidence that the work cannot be done elsewhere. As was made very clear in the President's Report, government contracts are performed strictly on a basis of absolutely no profit and no loss to the Institute.

Although research work must necessarily result often in explorations whose value is negative, as it consists of proving that a thing cannot be done in a certain manner, the Committee find that the percentage of success shown by the research staff will compare very favorably with that shown by other laboratories. Mr. Sage expressed it as his opinion that the Institute's percentage of successful research has been about five times the normal.

The Committee believe it advisable to state here the fact which President Compton and other officers of the Institute have made clear in their reports in regard to patents, namely, that in the large contracts which are carried on mainly by staff recruited from outside the Institute, Technology has felt it improper to attempt to acquire any special benefits from patents. In the Radiation Laboratory, for example, all patent rights are offered free to the government. (Concluded on page 458)

* Members of the Committee for 1943-1944 are W. Cameron Forbes, chairman, B. Edwin Hutchinson, '09, Ralph D. Booth, '20, Uncas A. Whitaker, '23, William Steinwedell, '25, Isaac Harter, and Charles R. Hook.

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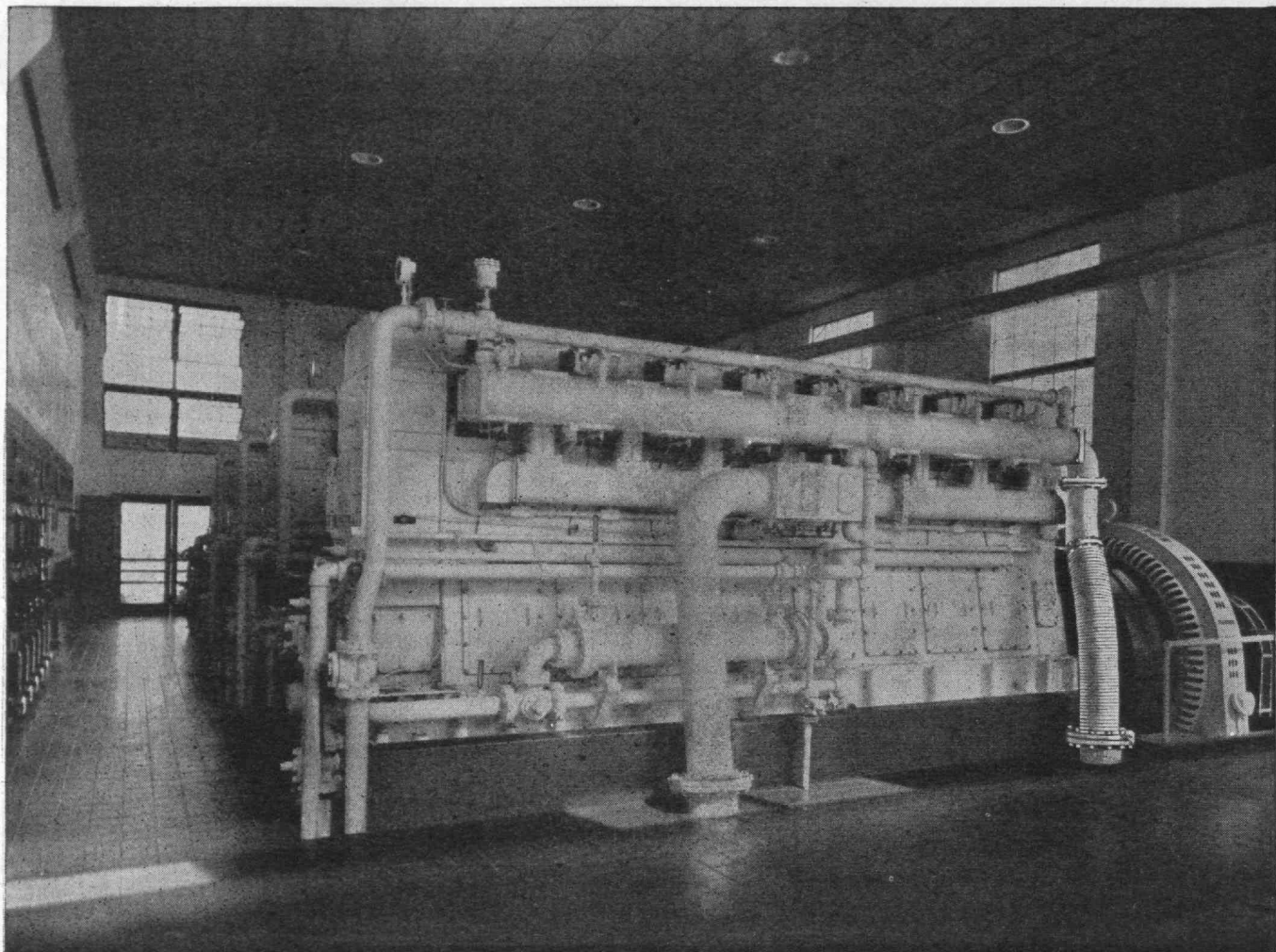
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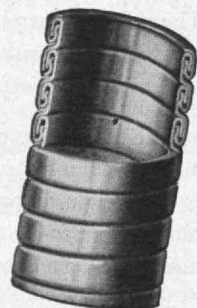


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O.W.L. Photo by Palmer, in an Allegheny Ludlum plant

... But Not to Hitler's Taste

WAR'S emphasis is on *strength*, in men and in steel. That truism is pictured for you above, in a scene showing the last admixture of alloys going into an electric furnace in one of the Allegheny Ludlum mills.

In the shortest possible time after the arc is struck, that batch of alloy steel will be war material in use. It may be stainless bomb racks or ammunition chutes; tool steels fashioning a tank; valves or nitrided shafts in engines; electrical steels in gun, engine or plane controls—or in radio range-finding and com-

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Allegheny Ludlum
STEEL CORPORATION
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INVENTOR'S PROGRESS

(Continued from page 421)

Here was the first practical rotary converter. The principle had been foreshadowed by others, but Lemp was the first to give it form. The converters were soon standard in railway welding and presently became standard, also, for the converting of alternating to direct current in trolley substations. It was one of the most important contributions he ever made.

By 1890 electric welding had become a lusty young business. Welding machines were in tremendous demand by every kind of manufacturer, and Lemp and his staff were pushed to the limit designing special apparatus for hundreds of different jobs. For the next few years the company expanded rapidly, becoming one of the leaders in the electrical field.

But Lemp, busy as he was, never let himself get separated from Elihu Thomson. He would visit Thomson's office almost every day and thrash out some problem with him. Frequently he would accompany his chief to dinners and on trips. In 1893 the two went together to the World's Columbian Exposition at Chicago, where Thomson presided at the International Electrical Congress as its chairman pro tem. At the grand banquet which closed this important gathering, one of the guests of honor was Thomas Edison, by now a legendary figure. Von Helmholtz had come to America for the meeting and, with other European physicists, dominated the occasion. Edison, by his own insistence, remained as inconspicuous as possible. Lemp wrote later of the little incident, in a way which beautifully illustrates his affectionate regard for his two great mentors:

Mr. Edison was not a delegate to the congress and so occupied a place at an out-of-the-way table. No slight to him was intended; the committee knew of his dislike of public appearances and so left him to himself.

But it did my heart good to see Professor von Helmholtz, one of the greatest luminaries among physicists, step down from the speakers' table and come over and shake hands with Edison. Then a little later the whole room began to rap the tables and call in a loud voice: 'Edison! Edison! Speech!' Mr. Edison got up quietly, smiled, bowed across the room, and sat down. Again the cries came for him to speak and again he got up, smiled, and sat down without a word.

Finally Professor Thomson, at the speakers' table, rose and said, "Well, if Tom will not speak, Tom's son will have to." And then my professor gave a fine address, simple and to the point as he always did — quite the best speech of the evening.

It was a favorite trick of Lemp's to carry many unsolved problems in his head, letting them lie undisturbed until a solution flashed into his mind. For some time now he had been mulling over the difficulties photographers had been having with the clumsy glass-plate negatives of the day. Not only were they inconvenient but the most valuable ones were always getting broken. Suddenly, as he sat listening to the speakers that night in Chicago, a solution came to him. "Why must we use glass?" he thought. "Suppose we put the photographic emulsion on transparent celluloid. It can't break, even when bent. It is light and cheap to manufacture."

After the dinner he hurried to the professor with the idea. Thomson was immediately enthusiastic. The minute they got home, they would try it out. But they never did. That fall the severe financial panic of 1893 swept over

the land, driving every manufacturer to cover. The General Electric Company, just formed out of Thomson-Houston and Edison's firms, fought for its life, slashing salaries, curtailing production, stopping most development work altogether. Even Thomson and Lemp, who were reduced to skeleton staffs, had grave doubt whether the electrical industry, so young and quick grown, could survive. The celluloid film idea was forgotten, to be discovered independently a year later by George Eastman, who made it the basis of a great industry and a vast fortune.

As depression deepened, the welding company staggered. Hermann Lemp was still chief engineer of the outfit, but his job had dwindled to almost nothing. Orders had stopped coming in. If the factory were not to close down, some other work must be found for the men to do. He went to the professor in desperation and discovered that as usual Thomson's mind was bubbling with ideas. They sat down and talked things over. Out of the welter of penciled scrawls on the backs of envelopes came three suggestions that seemed worth a try. One was an internal-combustion engine run by kerosene; another, a motor-driven refrigerator; the third, the electric furnace.

Lemp immediately obtained the manufacturing rights to a Swiss engine that was successful in Europe. Redesigning it to use the American brand of kerosene, he put it on the market. The engine worked well and some were sold. But the kerosene exhaust made a terrible smell and could not be tolerated except in the open country where the wind blew it away. Soon the business had dwindled and died.

The refrigerator fared no better. Thomson's idea had been to put out a household model which would, as he expressed it, "torpedo the iceman." But with the help of the conservative householder and the general lack of domestic electricity, the iceman refused to be sunk. Home refrigeration never got beyond the paper stage then. When it finally came to fruition, both he and Lemp were far afield with other things.

The electric furnace, too, eventually saw final accomplishment and became a mighty industrial tool. Its development, however, required many years of trial and failure. It was of little help to Thomson and Lemp in the depression of 1893.

Hermann Lemp came to the professor one day, shortly after this, with a sad story. The welding company had let him go. He was out of a job. Thomson angrily assailed the directors but could get no satisfaction for his protégé. There had been a verbal understanding but no contractual guarantee that Lemp should be kept on in hard times. Rather than involve his benefactor in court proceedings, the young man went back to work as a laboratory mechanic in the Lynn plant of General Electric. Thomson was delighted to take him on again as his special assistant.

"I tell you what you do," he said one morning, as Lemp entered the office. "You begin by figuring out a way to open this safe." His secretary had died and the combination could not be found anywhere. The professor badly needed some patent papers locked up inside.

"Professor," said Lemp, "if you will stand the expense of repairing it, I'll open that safe in jigtime!" Thomson agreed. Hustling over to the adjoining building, Lemp connected a pair of heavy cables to a direct-current

(Continued on page 438)

The tests that come *before* the test of battle

MEN MAY RISE above themselves to meet the test of battle, but equipment must be built that way. Good enough to match the performance of American boys at their inspired best. Tough enough to meet their need when the going gets toughest. To be sure that it is, every piece of G-E battle equipment is subjected to pre-battle tests that sometimes combine the pitch of a destroyer's bridge, the earthquake of a battleship's guns, the screaming 9 G. pull-out of a fighter plane's dive, the 60 degree below zero cold of substratosphere flight—all rolled into one. These tests are tough because the conditions under which our forces are fighting today are the toughest under which men have ever fought. Equipment dies on the testing stand, but lives are saved in battle.



BODY, BOOTS, AND BRITCHES, goggles and gloves of the G-E flying suit are electrically heated to keep bomber crews warm at high altitudes. But what happens if the plane is forced down, and the power is cut off? To find out if the suits, unheated, were warm enough and tough enough, G-E engineers put them on and climbed Mt. Washington in the dead of winter. The suits passed this, and every other test.

BUMP TEST FOR LAMP BULBS. No Humpty Dumpties are these G-E lamp bulbs, which take a fall from 6 to 30 inches every time their revolving cage turns over. G-E lamps, radio equipment, and control devices must take their share of shocks in battle along with the bombers and tanks and battleships they ride.



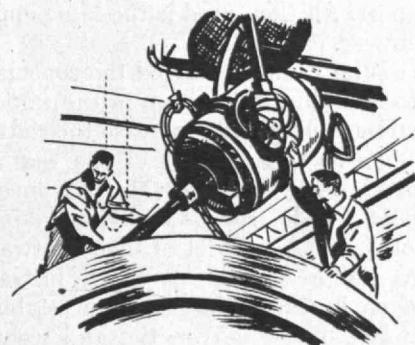
THESE ARE JUST a few of the more unusual tests to which a few of the many items of G-E war equipment are put. The greatest test of all is the experience of the maker, the years of research and engineering, the background of engineering and of manufacturing skill, which goes into the design, development, and making of every product. General Electric research and engineering, which were available to you in many products bearing the G-E Monogram before the war, which will again be available to you in many new and improved products after the war, are now available to the man you know in the armed services, in every piece of battle equipment G-E. builds. *General Electric Co., Schenectady, New York.*

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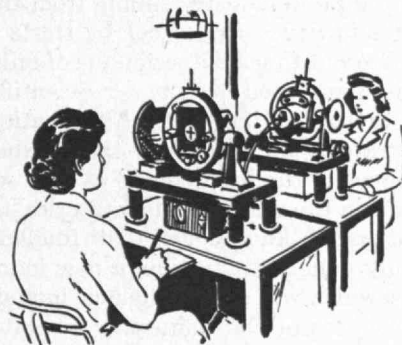
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INVENTOR'S PROGRESS

(Continued from page 436)

generator there and brought them in through the office window. Then, with a pair of arc-welding electrodes, he burned a hole through the safe and removed the lock entirely.

The professor snatched out his patent records. "Now, Lemp," he grinned, "we will have to keep this thing dark. Otherwise all the burglars will begin buying welding apparatus."

It was with a spirit like this that the two faced the hard times ahead. And as the company gradually climbed out of the depression, the team of professor and pupil pioneered their way into some of the greatest developments of the mechanical age.

(To be concluded)

BRITISH INDUSTRY AND RESEARCH

(Continued from page 422)

wars, British scientists have proved that they can more than hold their own if they are given equal facilities and support. All they need is the same opportunity in peace as in war.

It is impossible to avoid the conclusion that if Britain is to maintain its position in the world markets, our industries must greatly increase their attention to research as soon as the progress of the war makes it possible. There is danger in delay: Markets once lost are not easily regained. Industrialists should be taking active steps now to organize this aspect of their postwar activities.

At the present time, research in Great Britain is carried on in five main groups of establishments: (1) laboratories of the universities and technical colleges; (2) research stations of the Department of Scientific and Industrial Research, and of the Agricultural and Medical Research councils; (3) research associations supported partly by industry but aided by grants from the Department of Scientific and Industrial Research; (4) research laboratories maintained by private firms; and (5) research establishments of the fighting services.

Great industrial developments usually depend on fundamental discoveries; thus the electrical industry grew from Faraday's researches on electromagnetic induction, and the radio industry sprang from the work on electromagnetic waves carried out by Hertz in a university. In more recent times the technique of radiolocation was first devised and used for a purely scientific purpose without any thought of its practical application. These examples illustrate in a striking way the unexpected practical significance of the by-products of pure scientific research.

It is in the university laboratories, the outposts on the frontiers of knowledge, that fundamental research is mainly done. At any time a new industry may be born there which will meet some new human need. It is in the atmosphere of the university laboratory, too, that the men on whom we shall have to rely as leaders of industrial research are bred and trained.

Business therefore has a direct interest in seeing that research at universities and in technical colleges is adequately endowed.

Research stations of the Department of Scientific and Industrial Research now consist of the National Physical Laboratory, the Fuel Research Station, the Building Re-

search Station, the Forest Products Research Laboratory, the Road Research Station, the Water Pollution Research Laboratory, a group of stations under the Food Investigation Board, and so on. The program of each station is drawn up on the advice of a research board consisting of outside scientific men and industrialists, with representatives of interested government departments. A few additional research boards do not maintain laboratories but place their work extramurally at universities and elsewhere.

The National Physical Laboratory was originally established for the maintenance of national standards, but it is now organized into a group of departments—for example, aerodynamics, metallurgy, engineering—which carry out research, mainly of a fundamental nature, directed to industrial needs. A certain amount of research is also done for research associations and for individual industrial firms.

The other large stations deal with the nation's general needs in regard to food, housing, fuel, roads, and so on. They, too, undertake work for government departments and for industry and are always ready to act in an advisory capacity.

The results of individual work for private firms are, of course, communicated in the form of a confidential report and the full cost is paid by the firm. The results of the general program of work are made available in annual or special reports sold through His Majesty's Stationery Office. Firms, therefore, can benefit from all this work, as well as have access to the advisory and information services of the stations, usually without any payment.

Research associations were started at the end of the last war with the help of a million-pound fund voted by the government to the Department of Scientific and Industrial Research. There are now 24 of them, and they are self-governing bodies, supported voluntarily by firms engaged in the industries for which they cater, or in a few cases by a levy on the raw materials of the industry in question. The Department of Scientific and Industrial Research supports the associations financially by means of annual grants in amounts depending on the subscriptions from industry. This year the total incomes of the associations will be over £800,000, of which £275,000 will be government grant. The subscriptions vary with the size of the member firm, being sometimes as low as £10 annually for the smallest unit. Most of the associations possess their own laboratories, but some of their work is done in government or university laboratories or in the laboratories of member firms. The control of the associations is in the hands of councils elected by the members; the results of the work are confidential to members in the first instance, but much is subsequently published and added to the general fund of knowledge.

Although most of the associations have steadily expanded in size and usefulness, they are not yet on a scale commensurate with the industries they serve. One of them is now planning to spend £200,000 per annum, but only four of them have an expenditure exceeding £50,000 per annum, representing .06 per cent of the turnover of the industries concerned.

It is not only the more modern types of industry that have co-operated in founding research associations. Out of more than 20 such bodies, only three or four can be described as serving industries which have developed from

(Continued on page 440)

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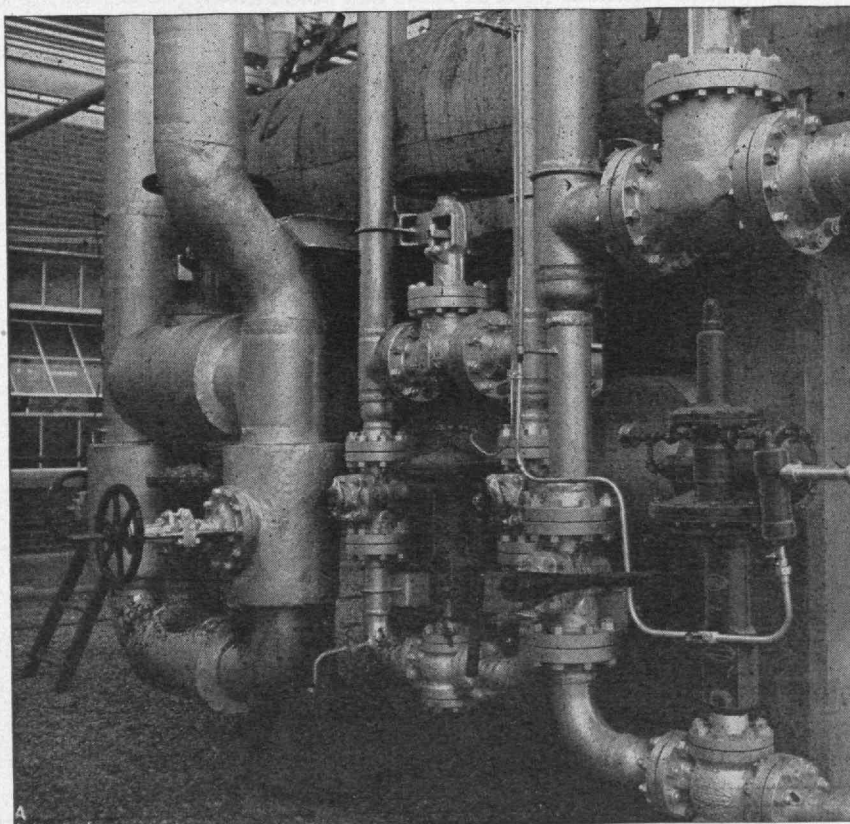
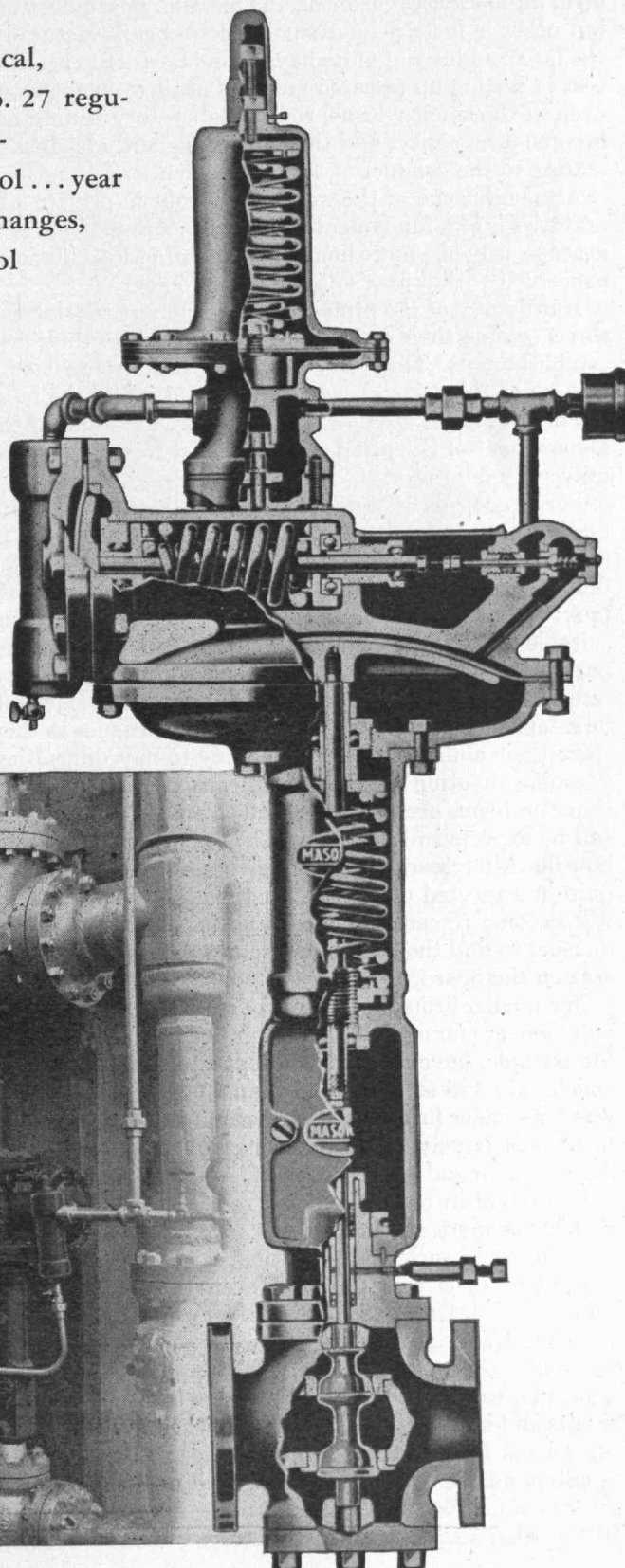
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BRITISH INDUSTRY AND RESEARCH

(Continued from page 438)

recent inventions and research. The great majority relate to industries which have been established for a century or more, showing that traditional methods are equally responsive to scientific analysis and the developments which spring from it.

Private industrial research laboratories were first set up in the electrical, chemical, and metallurgical industries, but other industries have since followed suit. Naturally, the larger industrial units have found it easier to bear the cost of setting up research facilities of their own, though even in the smaller firms, routine laboratory testing has become a necessity, and this not infrequently leads ultimately to the conduct of actual research.

Although some of the work carried out in private laboratories is of a fundamental character, a proportion of it is necessarily of a more immediate and practical character concerned with a firm's day-to-day problems.

Hardly any of the firms which possess research laboratories confine their expenditure on research to their own establishments. They are, as a rule, the strongest supporters of the research associations and make the most use of the results obtained in the research stations of the Department of Scientific and Industrial Research and at university laboratories.

For large firms little difficulty should be encountered in establishing research departments of their own and in building and equipping the necessary laboratories. The first step is to decide on the problems which invite attack; the next to decide on the scale of the attack, find suitable staff, and gradually make research a recognized part of the organization. This process will take time, as a research staff have to learn their problems. Confidence will be established between them and their colleagues as they show their ability to help in the day-to-day difficulties, "trouble shooting" as the Americans call it. The long-range problems need patience, and only a part of this work can be expected to bear fruit. It is surprising, however, how quickly research begins to give results, sometimes in quite unexpected directions. In time the whole concern will become research minded, and in America it is not unusual to find the head of a research department with a seat on the board.

For smaller firms the starting of research is not so easy, and there are far more of them. Our five largest industries, for example, have nearly 5,000 separate undertakings, of which only 126 employ more than 1,000 people each. It was for smaller firms that the research association movement was largely conceived, since by co-operative research an annual subscription of, say, £100 may insure participation in the results of a research expenditure of £20,000 or more per annum.

Payment of such a subscription, however, is only the beginning. It is essential that even the smallest unit should have at least one member of its staff with sufficient scientific training to follow the work carried out in the research association and interpret it to his firm. Such a man, too, can be of the greatest value in appraising the results and implications of other published research bearing on his firm's interests, and in general acting as a scientific adviser and consultant. Such men should be a more common feature of our industries, and they should be accorded a status which will insure their voices being

heard. No firm should be deterred from taking up research merely because it cannot afford in the first instance an expensive laboratory and equipment. It is the quality of the man which counts.

Industrial researches are undertaken either to increase the efficiency of existing practice and to lower costs, or to discover new products or new processes. Development is the stage at which promising research results are tried out in a pilot plant in order to adapt them ultimately to large-scale production. Not infrequently the same research staff and to some extent the same experimental technique will be employed in the development stage. For this reason the term "research and development department" is not uncommon, and many of the research associations possess development sections or at least development officers.

The stage between the perfection of a new process and its industrial application may be prolonged and difficult. Here the heaviest expenditure is likely to be needed.

Success in industrial research depends on several qualities — imagination, resourcefulness, and initiative, coupled of course with scientific instinct and a scientific training. Some men are best fitted for long-range fundamental work, others for applying its results and solving immediate difficulties. They should all be good mixers, for teamwork is essential.

Research is apt to conjure up in many minds a limited picture of a chemist in a laboratory, and whilst it is true that the chemist often forms the starting point around which a research team grows, industry now employs physicists, metallurgists, mathematicians, research engineers, biologists, and geologists, as well as specialists in more restricted fields such as radiology, corrosion, and statistics. Information officers, with a knowledge of foreign languages, are also found in the larger research establishments, since it is so essential to keep abreast of published scientific work at home and abroad.

A team of research workers usually consists of a number of university graduates with assistants. The graduates are recruited from the universities mainly as young men in their early twenties, and they are sometimes given experience in the works before going into the research laboratory. Such men are customarily paid a starting salary of £250 and upwards. The usual method of finding them is by advertisement in the technical and scientific press or by direct application to the various university appointment boards.

Nongraduate assistants, some of whom may ultimately qualify by taking external degrees or by passing the examinations held by the great professional institutions, are usually recruited from the secondary schools and technical colleges at an earlier age and lower salary than the university graduates.

The success of a research laboratory depends on the men with ideas. Only experience can show who they are. They may come in as university graduates, as assistants, or as laboratory boys. Encouragement and a watchful eye are needed to find them.

It is difficult to lay down any general standard of research expenditure. It has been stated that whereas Russia's total budget for science is 1 per cent of the national income, ours is but one-tenth of 1 per cent and that of the United States three-tenths. Taking expenditure by individual American trades, we find the ratio of the re-

(Concluded on page 442)

KEEPING UP WITH *Electricity*

BROADCASTING TIN. "Flowing" tin plate by induction heating is now accepted practice in the industry. Frequency used in the first installation was 200,000 cycles per second—and the equipment was salvaged from a discarded broadcasting unit! Incidentally, this first installation is still in daily use.

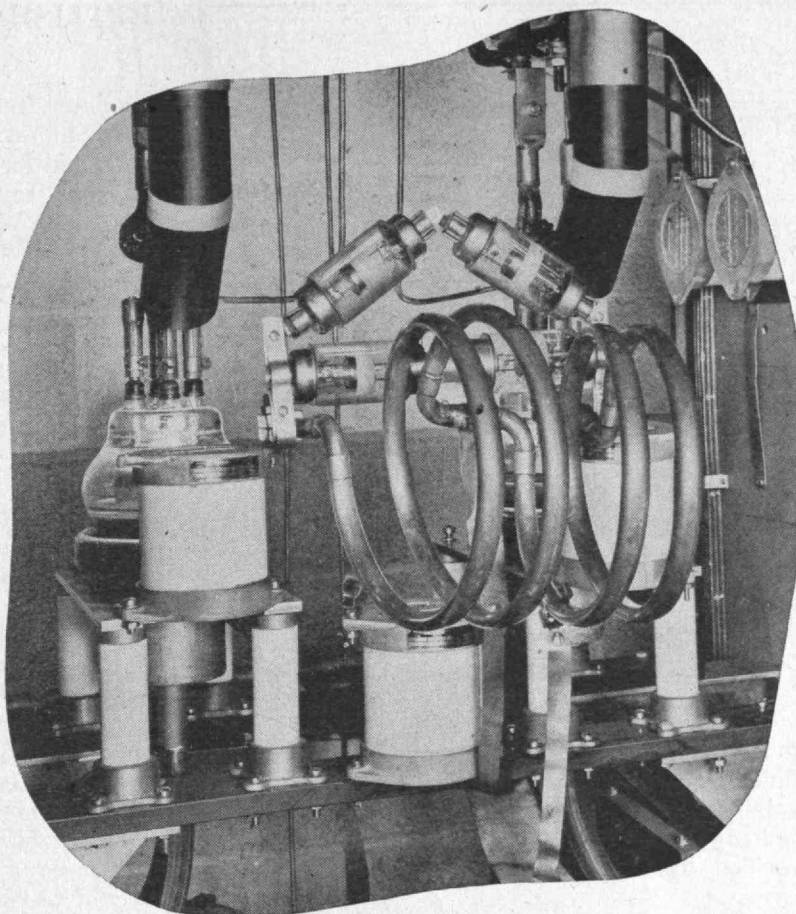
IT'S A MATTER OF SPEED. Radium gives out 1,200,000 times as much energy as the same weight of coal burned with oxygen. Even if we had plenty, however, it would probably be a poor substitute for coal, since it releases energy only one-eightieth as rapidly. Nothing that scientists have been able to do has had the slightest effect in speeding up the process.

THE SUN IS STILL SLOWER, releasing energy by a process which involves the transmutation of elements and takes between six and seven million years.

WOMAN'S WEAPON. One reason that electric irons aren't being made is that the thermostats used to control their temperature are busy on land, sea and air. They're guarding against motor trouble in tanks, fire danger in planes, overheating in gun equipment on battleships.

PEAK FLATTENERS. Resistance welders have speeded up production in thousands of war plants, but they have imposed enormous on and off single-phase loads on power circuits, often building up impossible peak demands. Capacitors are proving to be the answer, correcting the power factor to approximate unity.

THE HIGHER, THE FEWER no longer applies in radio vibrators. At high altitudes, vibrator contacts literally "boiled away" in ten hours, hence this type of radio was seldom used in airplanes. New-type vibrator, using Westinghouse-developed materials and techniques, has a life expectancy equal to that of the plane.



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This is a Westinghouse laboratory set-up for research in dielectric heating—internal heating by high-frequency radio waves. Together with induction heating—surface heating of metals by high-frequency radio waves—this process is daily finding new applications in industry.

One outstanding use of the principle of high-frequency heating is the Westinghouse development of flowing of tin on steel strip. Other important applications are in the bonding of plywood and the curing of plastics.

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BRITISH INDUSTRY AND RESEARCH

(Concluded from page 440)

search budget to gross sales as follows: for radio apparatus, 1.6 per cent; for electrical communication, 1.4 per cent; and for chemical industry and rubber products, 1 per cent. In the older industries, however, the ratio is much less. Whatever the scale on which research is begun, general experience is that its budget increases as it is found to be more and more indispensable.

The initial step of subscribing to a research association is not costly. Often a small firm would be assessed for subscription at 10 to 20 guineas, and not many of the larger units subscribe more than £1,000 per annum. In two typical research associations at the present time the average subscription of members is only about £50. For this small outlay, the subscribing member participates in research costing 500 times this figure. However, subscriptions to research associations must in future be larger, in order to give the associations more nearly adequate resources.

The cost of a research department obviously depends on its size. The small firm may employ only one scientist, costing, say, £500 a year and laboratory expenses. In the larger research units the annual cost may be taken as roughly equivalent to the capital cost of the laboratory and equipment. Thus, a laboratory costing £10,000, in which a considerable volume of research work could be done, would require a similar annual expenditure in salaries and running costs, representing 1 per cent of a turnover of £1,000,000.

It is important to remember that the running costs of research are allowed by the inland revenue as a deduction for income-tax purposes. This applies equally to annual subscriptions to research associations, except in respect of any entrance fee and specific donations for capital purposes.

That research not only pays but is of vital importance to our national existence is clear in wartime. Think what we owe to the supremacy of our aircraft, thanks to research in aerodynamics, light alloys, and the internal-combustion engine; to the rapid solution of the problem created by the magnetic mine; to the development of radiolocation. Less spectacular but of almost equal importance are the results of scientific research into the use of alternative materials which we have had to employ either to save shipping space or because we have been cut off from our accustomed sources of supply.

What research has meant in peacetime can be seen from the savings that have come from a few inventions. It is estimated that the gas-filled lamp developed by Langmuir represents an annual saving of £50,000,000 in the cost of domestic lighting in this country alone. The improvement in the efficiency of the gasoline engine due to lead ethyl saves over 2,000,000,000 gallons of gasoline a year. The use of accelerators for vulcanizing rubber has saved capital outlay on molds estimated at £16,000,000. Research on motor tires has increased their average life from 3,000 miles to over 20,000 miles. Naturally, these vast savings have been reflected in the profits and prosperity of the industries and firms responsible for these great technical advances.

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THE LITTLE RED SCHOOLHOUSE

(Continued from page 425)

which make up a large institution. Many universities, composed of semi-independent units, have a difficult problem in obtaining uniform and central handling of industrial contracts.

For local reasons neither of these causes for establishing foundations applies so forcefully at M.I.T. As a privately endowed institution, we are free from many restrictions applying to state institutions, and our Division of Industrial Coöperation has been successful in centralizing and systematizing our industrial relationships.

Another objective in setting up foundations has been the desire to keep the parent institution out of the business of managing patents and engaging in other commercial practices with a profit motive. The foundation is set up as a legal or corporate screen, although usually it is controlled by the institution or by alumni. A final reason prompting the separately organized corporation is the desire to draw in prominent alumni or businessmen to handle industrial research and patents. Through the mechanism of the separate corporation, these friends of an institution can carry on business in behalf of the institution and can show a definite profit and loss result of their interest and activity.

These latter two reasons do apply at Technology, although we have available different solutions. Through our connection with Research Corporation, we have kept our patents at arm's length, and we are making progress in developing other techniques for keeping the

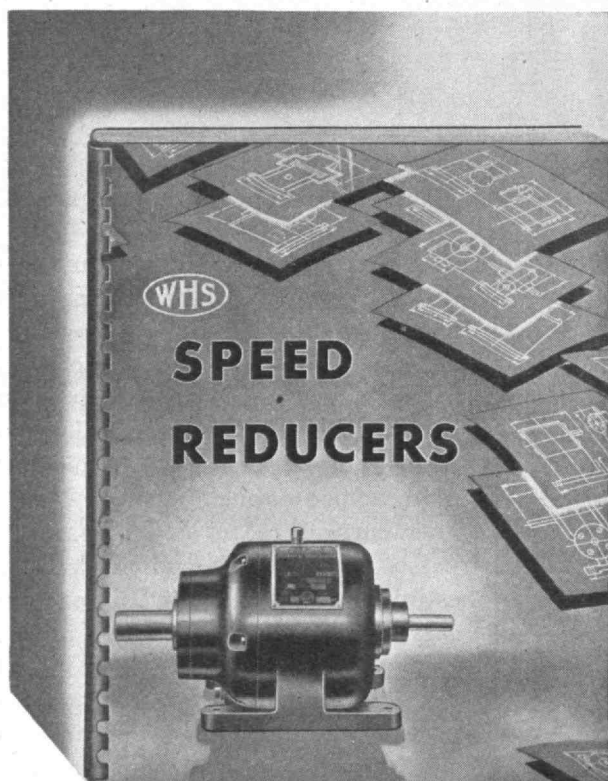
Institute out of the business of handling patents. We are convinced that there are still powerful reasons why we should keep out of direct management of patents.

I think a clear conclusion can be drawn that for local reasons the separate corporation is not the best solution for Technology although obviously it has been for many other institutions. There remain, however, several important considerations in connection with the handling of industrial research, especially with respect to relating such research to the educational activities of the institution. Should the central organization, whether operating as a corporation or on some other plan, have separate laboratories? Should it set itself up as an over-all laboratory similar to our former Research Laboratory of Applied Chemistry? Should the dominating objective be research for its own sake or for the training of men?

The answer to all these questions lies in the answer to the last, and here I believe that the answer is clear: All industrial research activities should be incidental to, and handled to contribute to, the training of students and the program of fundamental research. In our statement of policy on the Division of Industrial Coöperation and in our pre-war program, we recognized this principle. To be sure, the "crash" research programs of the war have quite properly put concrete research results ahead of everything else, but there is going to be a struggle after the war to reorient ourselves and to replan our industrial research program with an educational objective.

I suspect that the educational objective has more appeal for industry, and that we could build our volume

(Continued on page 445)



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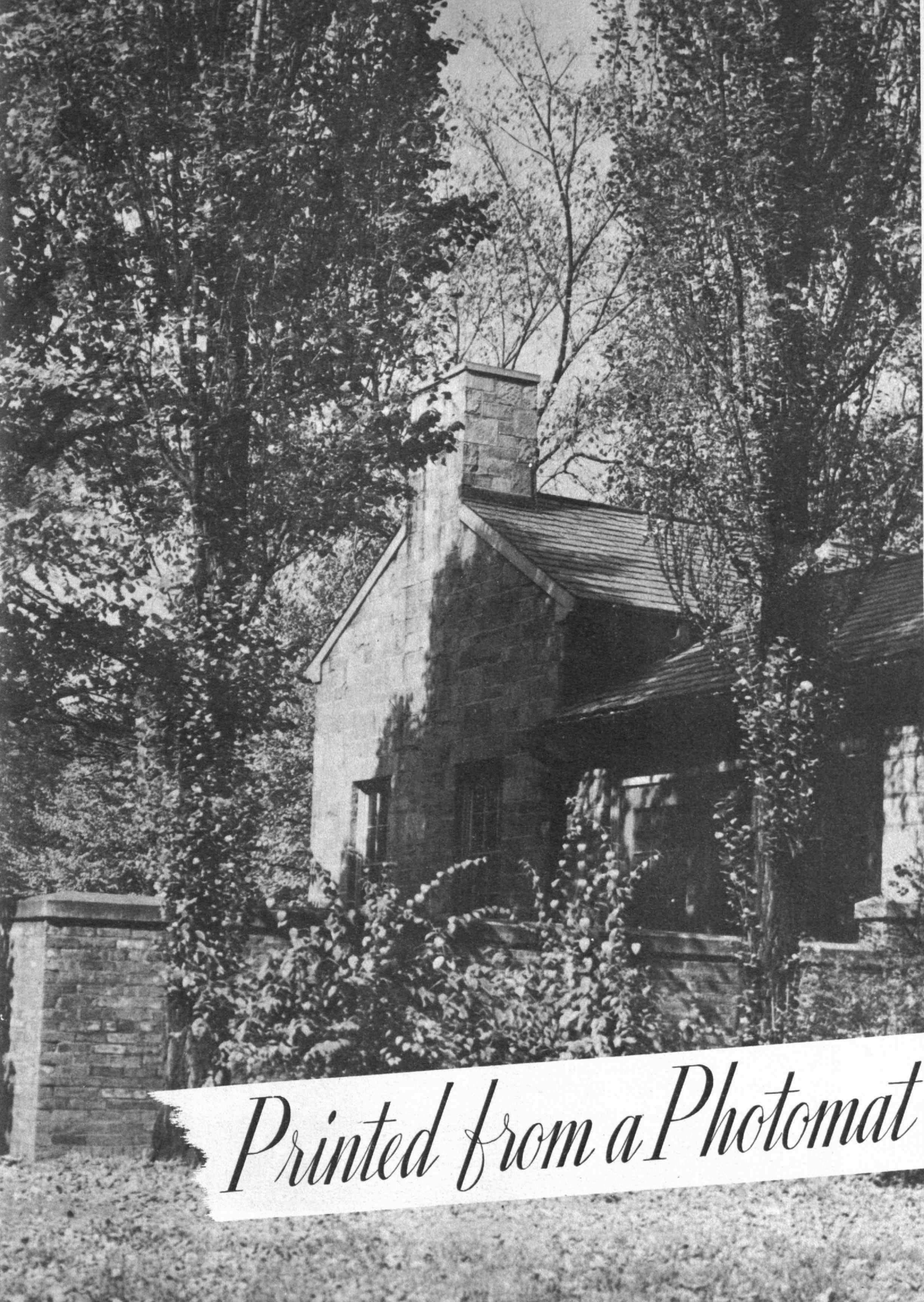
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THE LITTLE RED SCHOOLHOUSE

(Continued from page 444)

of industrial research more effectively by promoting it as primarily of educational value. This does not mean that getting research results is not important. It means that many companies have more interest in the training of top-notch men and in assisting institutions to perform this task than in seeing educational institutions build up elaborate research organizations. We have had several concrete examples of this attitude on the part of industry and have received contributions from them for the support of research on a pure *pro bono publico* basis.

Several of the university research foundations have adopted this educational objective with marked success. Their idea is quite similar to that which dominated the old Research Laboratory of Applied Chemistry which flourished at the Institute after the last War and was so effective in training chemical engineers. Perhaps in this direction lies one of the best prospects for our own industrial research program. The Department of Chemical Engineering has already laid plans for the establishment of a new Research Laboratory of Applied Chemistry, and other Departments are thinking in terms of similar solutions.

The officers of the Division of Industrial Cooperation, as well as other Institute administrative officers who have studied the problem, are convinced that industrial research should be handled on a departmental basis, even though business or contractual relationships are handled through the D.I.C. In the final analysis, it is most often a single professor or a small group who suggest the

research or who convince some sponsor of its desirability, and if the research is really to be followed through with enthusiasm and inspiration, it should be something that somebody on the staff wants to do, and not something that someone is asked or told to do as a problem brought in cold from the outside.

In other words, all considerations indicate that we should continue to keep our industrial research as decentralized as possible, letting it arise naturally from the interest and work of a Department or smaller group and letting it be chiefly work which they have instigated and can relate intimately to the training of graduate students. The main purpose of the research should be the training of these students, with research results still important but secondary. I speak here of course of industrial research, and I do not mean to say that an institution of this sort does not have a primary objective and responsibility of undertaking pure research as intensively as it can and of promoting the advancement of knowledge as a responsibility co-equal with the educational objective of disseminating knowledge.

Finally, a word about the part which research, particularly sponsored research, may play in the financial picture of the Institute. We all know that the trend in this country is against the growth of endowments and the increase of investment incomes. The endowed private institutions are almost certain to have severe financial difficulties in the postwar years, not immediately after the war but perhaps several years after it. Beyond tuition from students, how will they meet the problem of necessary income? It is not a happy prospect to antic-

(Concluded on page 446)



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THE LITTLE RED SCHOOLHOUSE

(Concluded from page 445)

ipate that we would have to meet it by taking on industrial research for the sake of income. It is nevertheless possible that a reasonable amount of industrial research properly subordinated to the educational program can be of great advantage both educationally and financially—financially if by no other means than helping to carry the overhead of the institution.

Patents have been suggested as another possible source of income, although our experience to date in dealing with patents would discount this. Certainly an educational institution should not have to engage in litigation and in maneuvering which inevitably go with the exploitation of patents. We should avoid giving patents undue emphasis allowing them to absorb an undue portion of staff and administrative energy to the detriment of more constructive activities. If profitable patents should come incidentally, fine; but it is questionable whether they should be considered in any planned effort to supplement income.

I have already mentioned the growing interest on the part of corporations to support research without strings attached. This is indeed a desirable way for us to supplement income, and we are developing some highly satisfactory procedures for promoting and handling this type of co-operation with industry. The recently established Carbohydrate Research Laboratory at the Institute, collaboratively handled with the Sugar Research Foundation representing the sucrose industry, is a fine example of an arrangement permitting fundamental research under the aegis of an enlightened industrial group. Similar arrangements are under study with other industrial groups as well as with individual companies. We all should prefer any of these methods to the remaining alternative of government support and government control.

One of the great hazards of the present war research program and war training programs as sponsored by the government in educational institutions is the difficulty which institutions are going to have in regaining their independence and resisting the seductions of Federal subsidy. Certainly our aim should be to stand on our own feet and to preserve the spirit of complete independence which has made research flourish and kept standards high in the private institutions.

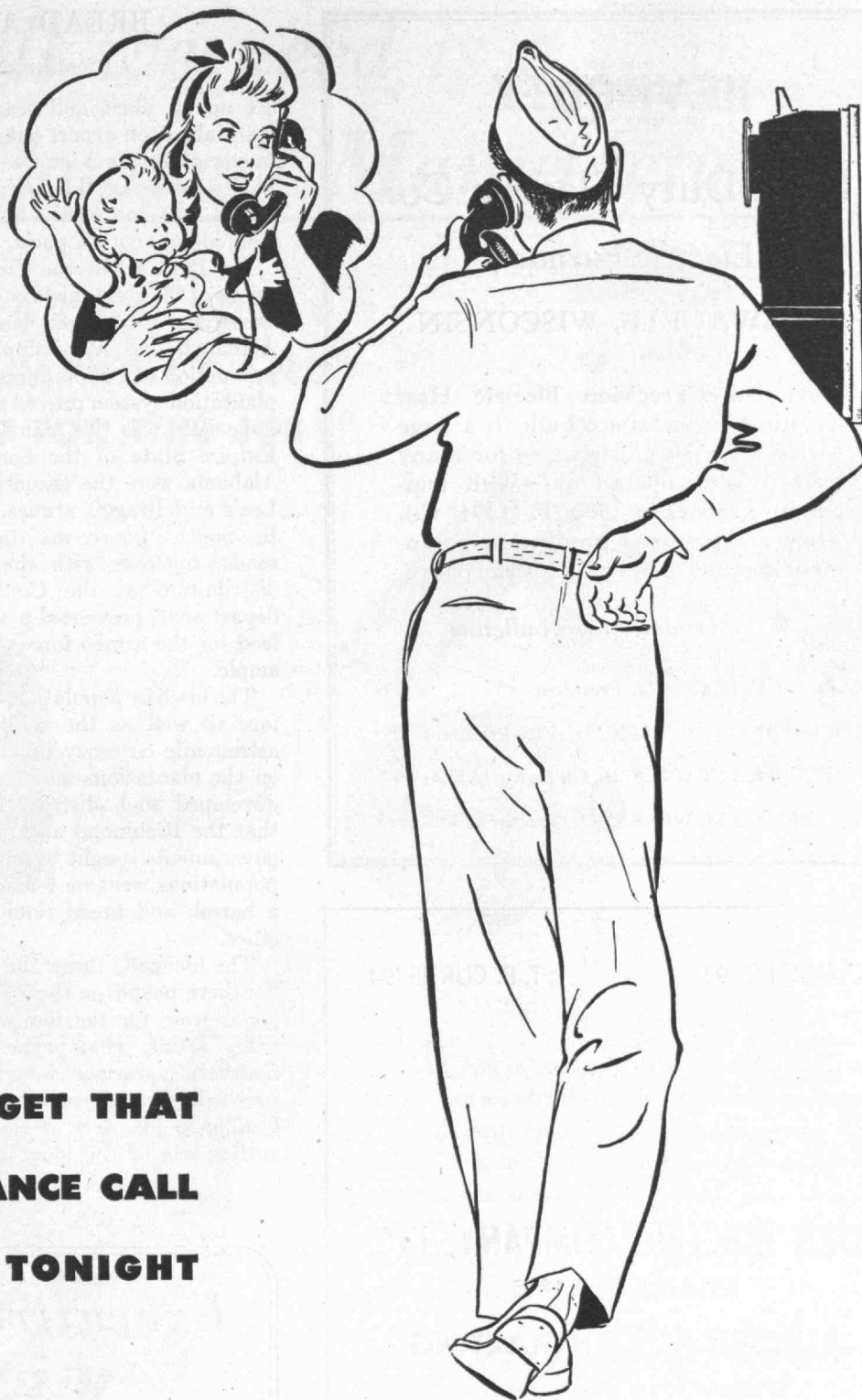
BREAD AND BATTLE

(Continued from page 427)

abroad operated to close down those great textile establishments and to throw their operatives out of employment. This would, according to the theory, occasion such widespread distress that the foreign governments would be forced to intervene.

Alas for the lucidity of this logic, it failed to give heed to the bad business conditions all over the world, which resulted in subnormal consumption of cotton. As a result, both England and France had unusually large warehouse stocks in the spring of 1861 and got along without distress until late in 1862. By the next year India, Egypt, the Sudan, and other cotton-producing areas had largely increased their yields, and the United States Army had

(Continued on page 448)



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BREAD AND BATTLE

(Continued from page 446)

set up an illicit and scandalous but nonetheless substantial cotton export out of occupied areas. The governments of Queen Victoria and Emperor Louis Napoleon finally made up their minds that war with the United States was too costly a price to pay for opening the Confederate cotton ports.

By 1863, when the Davis government became conscious of the great mistake of policy, stern necessity forced the transfer of much land in Georgia, the Carolinas, Alabama, and Mississippi from cotton culture to the production of food and feed. To the surprise of many, the plantation system proved able to adjust itself to the shift. Especially was this transfer successful in Georgia, "the Empire State of the South." That fall, Georgia and Alabama were the granaries for the sustenance of both Lee's and Bragg's armies. Difficulties of transport over the South's poorly maintained and worse operated railroads, together with the inefficient procurement and distribution of the Confederate Army's commissary department, prevented a satisfactory supply of food and feed for the armed forces. But the production had been ample.

The civilian population in the cities and towns did not fare so well as the soldiers, but the reason was the astronomic currency inflation, not the lack of supplies on the plantations and farms. The growers of food had developed such distrust for the Davis "shinplasters" that the Richmond authorities and several of the state governments sought to apply "forced loans." The urban populations went on forced diets, flour mounted to \$100 a barrel, and bread riots occurred in several Southern cities.

The blockade threw the overwhelming majority of the Southern people on their own resources. Blockade-runner goods were for the few who could pay high prices for silks, satins, champagnes, and Havana cigars. The Southern agrarians found berries which, when over-parched, seemed something of a substitute for coffee. Candle molds were worked overtime. The almost forgotten arts of the loom and distaff were brought into

(Continued on page 450)

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WHERE
Printing
IS STILL A CRAFT

BREAD AND BATTLE

(Continued from page 448)

play again. The mistress of the manor house learned herself how to tan leather, and then instructed her dusky servitors in the process—and the leather was well tanned. Hats were made from virgin wool. Cattle raising became a passion, flocks of goats were established, chiefly in the hope that invading Yankees would not regard them as such succulent seizures as were horses, mules, and beeves. And this hope was not disappointed. On the plantation, the Confederate conversion from cotton to subsistence was generally successful. But transportation troubles kept it from sustaining the Southern economy as a whole.

THE outbreak of the war immediately put a heavy burden on the Northern farmer, and one of an unexpected nature. He had to grow enough food, feed, and other agricultural productions not only to care for civilian and military needs but also to provide much of the foreign exchange for the embattled nation. Until the outbreak of the war, most of the foreign obligations of the United States had been met through the foreign exchange provided by export of Southern cotton, tobacco, and so on. This recurring foreign payment was heavy, because even until 1916 America was consistently a debtor nation.

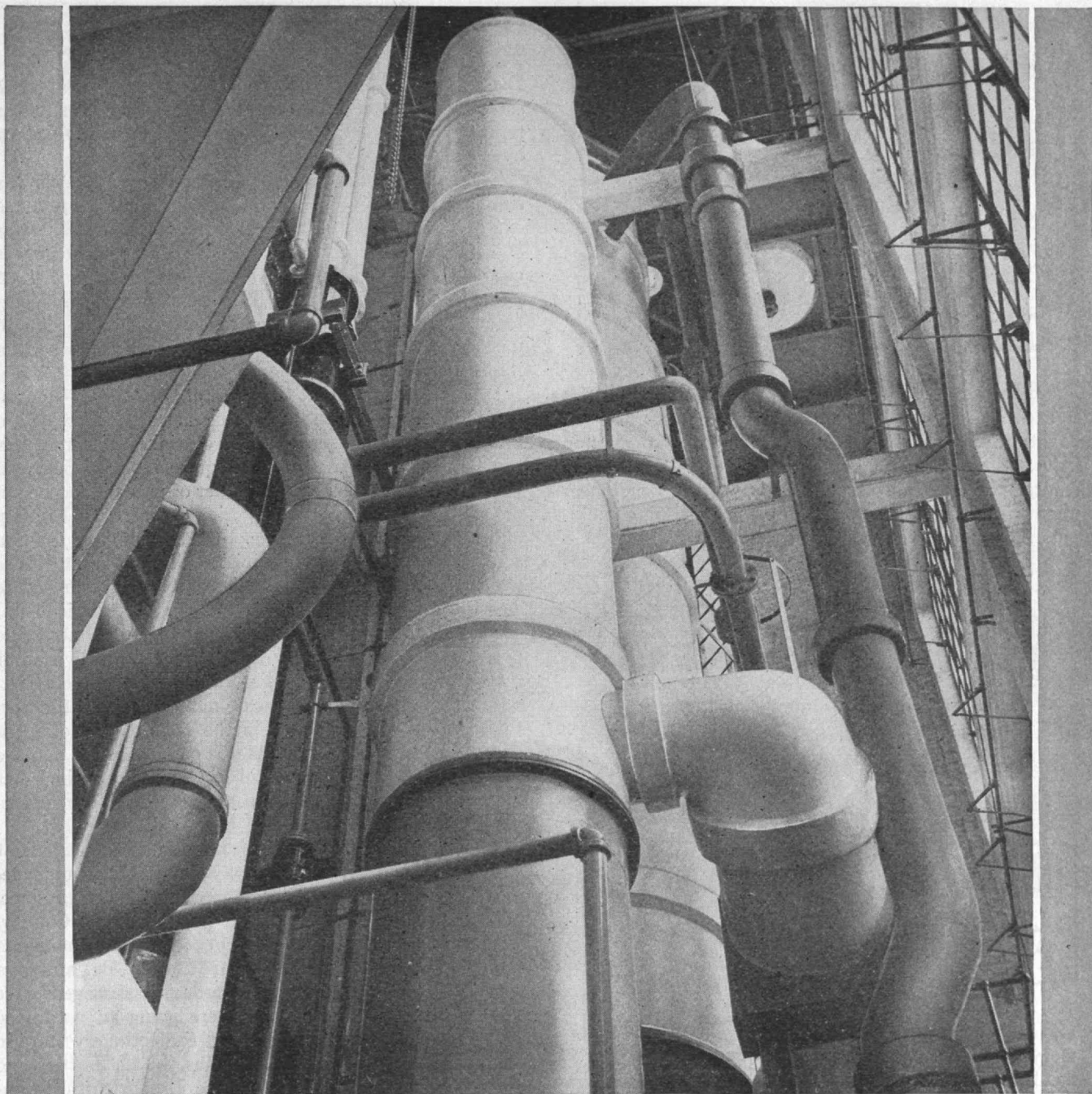
Most of this foreign exchange was suddenly suspended by secession, war, and blockade. There was some offset as Federal forces began occupying secession territory. Cotton was shipped north by one means or another, some of these shipments illicit and smelling of bribery and graft. But the increases in farm yields in the North during the war were astounding. These furnished the principal new source of exports abroad.

Through an interesting coincidence, the North's need to export greater volumes of its agricultural productions coincided with increased demands from across the Atlantic. Britain had crop failures in 1860 and in the next two years, her 1861 wheat production deficiency being about 40,000,000 bushels. The continental yields, particularly in Russia, Prussia, and France, Europe's three great cereal producers, were not any too good, and during these years the cereal export from each of the three to England decreased.

The resulting increased demand of England and western Europe for food and feed from America had a powerful effect upon the outcome of the Civil War. It helped the United States Treasury get the foreign exchange needed to finance the struggle. Also, agricultural exports played an insufficiently recognized part in causing the British and French governments to delay recognition of Confederate independence, and after 1863 to abandon the idea.

In 1860, the United States as an entirety had sent to Europe 1,926,000 barrels of wheat flour and 13,538,000 bushels of wheat. The next year the loyal states shipped 3,110,000 barrels of flour, and the wheat export had mounted to 28,899,000 bushels. During these three years corn exports increased more than threefold. Butter shipments doubled, then tripled. Cheese exports mounted from 23,000,000 pounds in 1860 to more than 49,000,000 in 1864. Lard export growths were even more amazing: the year before Sumter, 18,866,000 pounds; the year of

(Continued on page 452)



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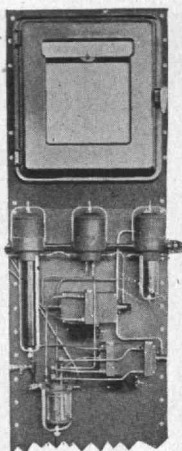
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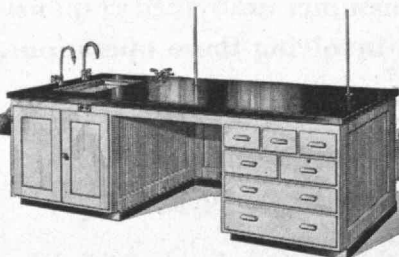
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BREAD AND BATTLE

(Continued from page 450)

Gettysburg, 121,881,000 pounds. In the 1859-1860 slaughter year, the number of hogs packed at Chicago was reported as 168,000; three years later it had increased to over 970,000!

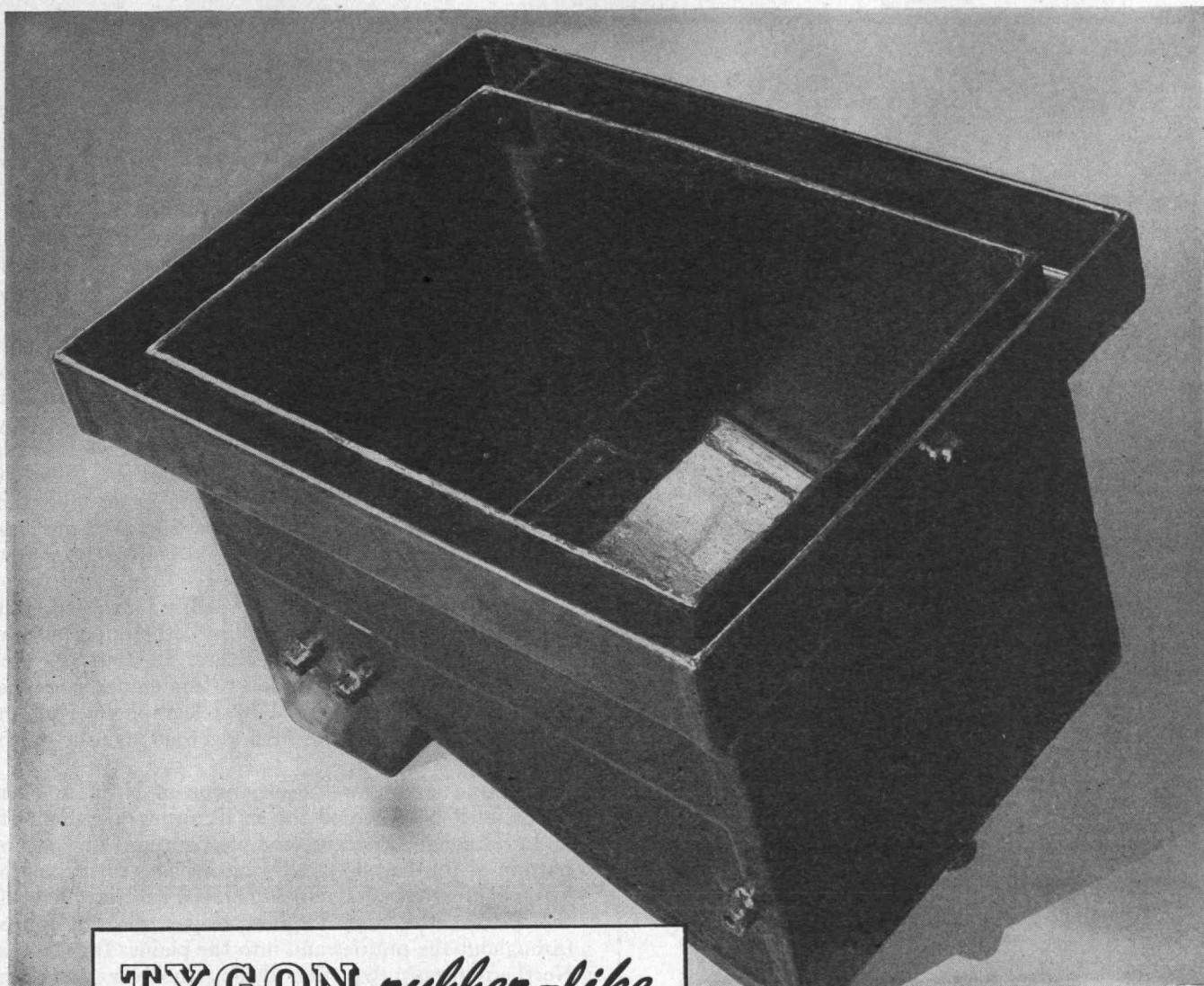
The increase in dollar value of agricultural exports was similarly impressive. The value put on domestic produce exported through the port of New York in 1860 was \$95,468,296. The next year it was \$131,325,995. There was equivalent growth during the next three years, the 1864 figure being \$201,855,989. These export increases performed a tremendous service in enabling the Union to meet the exacting pressures which the war imposed on its financial system.

It cannot be said that the effort of the Federal Government was a major cause for these enormous increases in natural production. Agriculture's official establishment in the bureaucratic structure was quite modest. Some 25 years earlier the then commissioner of patents had begun distributing certain new or experimental seeds, personally and independent of his office. In 1839 Congress made a small appropriation for a division of the Patent Office which should collect and distribute seed, prosecute agricultural investigations, and gather agricultural statistics. More money was given 15 years later, the position of superintendent of the agricultural division of the Patent Office was established, and a division chemist, botanist, and entomologist were named. During the war, this division was expanded into a Department of Agriculture, and Isaac Newton, its first commissioner, laid the foundations for the expert aid for the farmer which has increasingly characterized the last 80 years of the department's life.

This Isaac Newton, unlike his namesake, hearkened not to mathematics or to philosophy, but to farm management, including the finding of markets for his produce, and to practical politics. Born in Burlington County, N. J., in 1800, in the early Twenties he began managing family and other farms in Delaware County, Pa., and soon specialized in dairying. The herds he managed gave bountifully; milk and cream were going to waste; so Newton opened an ice cream and confectionery store in Philadelphia to take up the surplus. In the Forties and Fifties, he urged Congress to recognize agriculture's importance by establishing a department of agriculture. The only heed shown to these urgings was the establishment of an agricultural division of the Patent Office. Newton's political bent carried him over a good part of the Prairie States, and Abraham Lincoln met and remembered him, as evidenced by the Pennsylvanian's appointment in 1861 as superintendent of the agricultural division in the Patent Office.

The next year Congress focused its legislative attention on the farm problem. The departure of legislators from the secession slave states eased the task of passing the Homestead Act. A companion measure was the statesmanlike Morrill Act, which laid the foundation for an agricultural and mechanical college in every state. Further to give the legislative accolade to the farmers, Congress passed a bill, approved by the President on May 15, 1862, creating the Department of Agriculture to be headed by a commissioner. As was to be expected,

(Continued on page 454)



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## BREAD AND BATTLE

*(Continued from page 452)*

Lincoln elevated Newton to this new post, which he filled until his death in 1867.

Newton was full of energy and zeal, and he had considerable organizational skill. He named William Saunders, a Pennsylvania horticulturist, the department's botanist and "superintendent of the propagating garden." C. M. Wetherill was made the department's chemist, Townsend Glover its entomologist, and Lewis Bollman the statistician.

The commissioner was on the alert for opportunities to support the farmer, and occasionally was taken in by wags. In 1862-1863, he became alarmed over the sad state of agriculture, or sheep raising, in the Ohio Valley; the lambings had decreased greatly, and Newton sought a new type of ram to remedy the situation. Upon the suggestion of a friend, he asked Congress for an appropriation of \$15,000 to enable the department to purchase three hydraulic rams from Europe. Many were the guffaws on Capitol Hill.

He foresaw the usefulness of weather forecasts for the farmer. His first annual report urged the importance of weather predictions for agriculture. In 1864, Newton recommended an appropriation to enable daily weather reports to be communicated by telegraph over all the loyal states. He was the first vigorous sponsor of the weather bureau.

The true credit for the expansion of Northern farm yields must be accorded the small owner-operator farm and prairie homestead method of operation. The general pattern of this had been cut some decades earlier, as the keen cutting edge of civilization moved westward. During the Fifties, the new Virginia reaper was introduced throughout the prairies and into the plains. Its effect on Northern farm production during the war years was tremendous. Here was a first major move toward the mechanization of agriculture. The use of the reaper enabled the farmer-operator to harvest more grain with less labor. He could, therefore, sow more acres, and do his part to feed the Army, handle the needs of the civilian population on the home front, ship food to Europe — and he could spare his son to the army of Rosecrans, Thomas, Sherman, or Grant. There can be no question that the reaper was a most important weapon for the Federal side in the struggle.

Interestingly enough, Cyrus H. McCormick, inventor and promoter of the principal among the more than 100 rival reapers in production in 1860, had so little zeal for the Northern side that the *Chicago Tribune* and other political enemies accused him of being a Copperhead. McCormick had made his first reaper at Walnut Grove, in the valley of Virginia, in 1831, as an improvement on those his father, Robert McCormick, had made some years earlier. There is a legend that a letter President Jefferson wrote the elder McCormick, suggesting a device on "the scissors principle," incited the latter's experiments.

Be that as it may, McCormick moved toward his market, established a factory in Chicago in 1847, and was doing a national business almost overnight. In the Sixties he did not lack able rivals, like Obed Hussey, but his business genius and dominating force kept him far in the

*(Concluded on page 456)*

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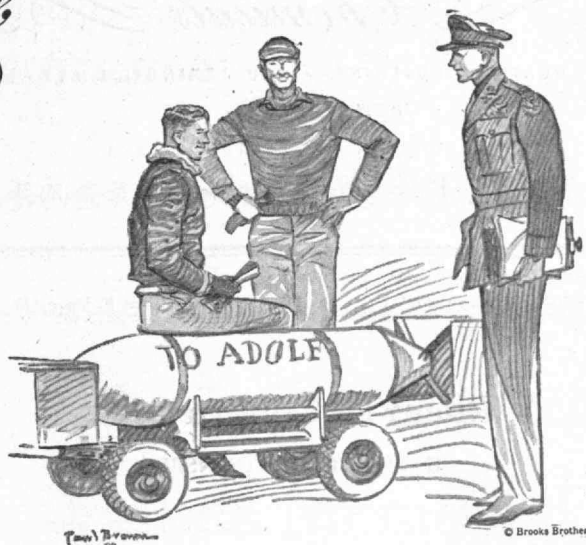
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## BREAD AND BATTLE

(Concluded from page 454)

lead in this development. He added many new devices, such as a mowing attachment, and coined money hand over fist.

The inventor of the reaper was one of the first million-aire manufacturers who wanted a political career, and from 1860 to 1880 this was about as important an interest to him as the domination of the reaper market all over the world. He brought proslavery views with him from Virginia, supported John C. Breckinridge for president in 1860, and bought the *Chicago Times* in July of that year to fight for his political views. His loyalty to the Union was so assailed by his enemies that, after Sumter, McCormick felt it necessary to publish a signed statement in his paper. This declared that, "though a native of the South, I am a citizen of Illinois, and of the United States, and as such shall bear true allegiance to the Government." This he would do "without considering whether my country is right or wrong." That same June he sold the *Times*, and a little later went abroad, ostensibly to promote his reaper.

In April, 1864, in a letter to the editor of his former paper, McCormick urged: "Stop the war, declare an armistice. . . . Another Republican President elected and the country — *the Union is lost.*" He returned to the United States a little later and became a candidate for Congress, but was defeated. Soon after Lincoln's reelection, the manufacturer published a letter saying that negotiations must be opened with the Confederacy; the "last chance" was to negotiate a peace, either on the basis of the Union with the slave states back, their "peculiar institution" safe; or on that of Confederate independence but no slavery in the loyal states! On December 7, he wrote the President asking permission to go to Richmond to negotiate with Davis to this end. Lincoln did not reply. Doubtless he felt that the contribution McCormick's reaper had made to the war more than offset its inventor's tergiversations.

The foregoing shows that, throughout the Civil War, the North was able to operate on the maxim: "Food is a weapon." Furthermore, the North's increasing agricultural production in the years right after the war enabled it, through continued exports, to keep on getting the foreign exchange to help the reunited nation carry on its changed economic structure and meet the increased social demands.

All of this may be of analogous value now, as we find the school of experience of immense value in helping solve the problems that confront us, and find history an illuminating teacher. The United Nations Food Conference held at Hot Springs, Va., in June, 1943, emphasized the importance of food both during the war and after the war. The principal theme stressed by the delegates from the four corners of the earth was that the postwar world would need more food and feed than had ever been needed before. They felt there would be no danger of a slump in the market for farm products. On the contrary, they felt that the potential agricultural demand of the people of the postwar world would be so great that all the nations would take steps to increase the general income so that the potential demand would be translated into a real effective present demand. Doubtless this is the new phase ahead in the world of food.

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## THE INSTITUTE GAZETTE

(Concluded from page 432)

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The Committee desire to repeat what was represented in our last year's report, namely, that this war is dependent for its successful prosecution more and more upon science, and that the M.I.T. is to be congratulated on forging to the forefront on this work. When the story of the achievement can be fully told, it will be a source of pride to all Technology men and to all Americans.

## THE TREND OF AFFAIRS

(Concluded from page 418)

pneumatic tires report indications that it escapes less easily from the tube than air does, and that it is less wearing on the tire. ¶ Soil in greenhouse beds is sterilized by a new process which involves covering the beds with sisalkraft paper and injecting live steam under it. ¶ Casting by the cire-perdue, or "lost wax," process described some four centuries ago by Benvenuto Cellini has been called into use in the manufacture of complicated parts for the turbo-superchargers that make possible high-altitude bombing. An accurate master mold of lead alloy is filled with molten wax in an injection machine, forming an accurate wax pattern of the desired casting. About the pattern, a mold is formed of graded silica sands with a binder; after this mold has set, it is placed in an inverted position in an oven heated to about 250 degrees Fahrenheit, so that the wax of the pattern melts and runs out, leaving a precision mold in which suitable metals and alloys can be cast to tolerances of .002 to .005 for each linear inch of casting. Machining thus is saved. ¶ Recently patented is a device which enables slot machines to put the heat on coins to determine their validity. The nickel thrust into the slot becomes part of a thermocouple which passes current in accordance with the conductivity of the coin in contact with an electrically heated pin. Slugs and counterfeit coins are much less conductive than the nickel alloy in the American and the Canadian five-cent pieces. Differences in the amount of current passed by the thermocouple decide whether the coin itself shall pass.

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# TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

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## THE MYSTERIOUS MISTER SMITH

*"When my first contribution to the M.I.T. was made, I had been carefully looking over the field for some time. I formed the opinion that there was no other place where a large sum of money could be invested with more effectiveness. That opinion has not since been changed in the least; in fact it was the growing strength of this conviction that led me to make my second subscription. . . . I naturally feel great satisfaction in being instrumental in helping . . . to carry out such farseeing plans for the development of the Institute, as I feel very strongly that the progress of this country is to be affected greatly by the men who are turned out of the M.I.T."*

**W**ORDS are cheap," someone has said. The writer of these words, however, implemented them in a manner which disproved that statement completely.

"The Mysterious Mister Smith" who penned these lines some 28 years ago believed them so sincerely that he gave over twenty million dollars to M.I.T. It was his beneficence which made our present educational plant possible. Older Alumni remember well that cloak of anonymity. Mister Smith was George Eastman.

Mr. Eastman was not an M.I.T. man, yet he believed in the Institute so thoroughly that he gave to it a large portion of his fortune. If he could see Technology today, if he could know of the accomplishments of its staff and its Alumni, we may be sure that he would realize that his confidence was amply justified.

**Y**OU, one of Technology's Alumni, have an opportunity which Mr. Eastman did not long enjoy. Through the medium of the annual Alumni Fund you can take an active part in the Institute's future, and you can have the satisfaction of watching that future develop, knowing that it is, in part, your own doing. Mr. Eastman's faith was not in a pile of brick and stone, not in laboratories or classrooms. It was in you, Technology's Alumni, the product of the physical plant which he made possible. Do you have that same faith in your fellow Alumni of the future? You can express it, in finite terms, through the Alumni Fund.



# TECHNOLOGY MEN IN ACTION

## M.I.T. MEN AT WAR

Up to April 10 over 5,600 Institute Alumni, including 24 Admirals, one Commodore, and 69 Generals, were recorded as being in the active naval or military services of the United Nations. New additions this month included Lt. Gen. Tsou Wong '16, Chinese Army; Rear Adm. Pellian T. C. Mar '15, Chinese Navy; Rear Adm. Allan J. Chantry, Jr., '10, Rear Adm. Felix B. Stump '24, and Rear Adm. Alfred M. Pride '26, U.S.N. There were 60 Alumni who had already been decorated.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

### NEW DECORATIONS

- 1907 Godfrey, Stuart C., *Brig. Gen.*, U.S.A., Legion of Merit — "For outstanding achievements, including development of transportable steel landing mats, now used in every theater of operation."
- 1921 Humphrey, Watts S., *Lt. Col.*, U.S.A., Legion of Merit — No details.
- 1923 Teale, Willis E., *Col.*, U.S.A., Distinguished Service Medal — No details.
- 1927 Gerhardt, William R., *Col.*, U.S.A., Legion of Merit — No details.
- 1934 Becker, Robert C., *2nd Lt.*, U.S.A., Purple Heart — Wounded in action in Italy.
- 1937 Wood, Floyd B., *Col.*, U.S.A., Legion of Merit — No details.

### NEW LISTINGS

#### U.S.A.

- 1922 Ditton, Erb N., *Corp.*
- 1931 McNiff, John J., *Capt.*
- 1932 Hieber, John G., *Capt.*
- 1933 Aldridge, Frederick F., *Maj.*
- 1934 Levatin, Paul, *Capt.*
- 1936 Stolz, Stanley B., *Capt.*
- 1937 Andelman, Sumner Y., *Capt.*
- 1939 Hutchins, Louis F., *Maj.*
- Salmon, John L., *Pvt.*
- 1941 Bishop, Edward C., *2nd Lt.*
- 1943 Brooks, Douglas L., *2nd Lt.*
- Burnham, Charles E., *2nd Lt.*
- Davison, James W., *Pvt.*
- Harker, James T., *Lt.*
- Lorenz, Edward M., *1st Lt.*
- Mudgett, Fred A., *2nd Lt.*
- Reid, Warren H., Jr., *Sgt.*
- Rogers, Jordan T., *1st Lt.*
- Tankoos, S. Joseph, Jr., *Pvt.*

#### U.S.N.

- 1919 de Lima, Oscar A., *Lt. Comdr.*
- 1922 Woodruff, Wilbur J., *Lt.*
- 1926 Whiting, Richard, *Lt. Comdr.*
- 1927 Kear, Frank G., *Comdr.*
- 1928 Palo, George P., *Lt. (j.g.)*
- Ryan, John M., *Lt. (j.g.)*
- 1929 Blake, Herford T., *Lt. (j.g.)*
- 1931 Brown, Curtis B., *Lt. (j.g.)*
- 1933 Schwartz, Herman V., *Lt. (j.g.)*
- Thomson, Alexander C., *S.1.c.*
- 1934 Dorr, Julian A., *Lt. (j.g.)*
- 1936 Gass, Harvey, *Lt.*
- 1937 Brettman, Herman, *Ens.*
- 1939 Cruciger, James R., *Ens.*
- 1940 Matthews, Owen W., III, *S.1.c.*
- Reynolds, Paul A., *Lt. (j.g.)*
- 1942 Hartley, Richard S., *Lt. (j.g.)*
- Winter, Phyllis, A. S.
- 1943 Bakker, Albert E., *Ens.*
- Beatty, Robert W., *Ens.*
- Carpenter, Stephen W., *Lt. Comdr.*
- Cassidy, William F., *Lt. Comdr.*
- Darnell, Victor C., *Ens.*
- Greenewald, Herbert, Jr., *Mid.*
- Hydeman, Richard R., *S.1.c.*
- Jouannet, Richard F., *Ens.*
- Shaffer, John N., *Lt. Comdr.*
- Shutack, John T., *Ens.*
- Thomson, James W., *Lt. Comdr.*
- Upham, John H., III, A. S.

#### U.S.C.G.

- 1943 Ottinger, Guy L., *Lt. Comdr.*

#### U.S.M.C.

- 1936 Bartlett, Alan, *Pvt.*
- 1943 Gleason, Howard S., Jr., *Corp.*
- Root, William L., *2nd Lt.*

### CANADA

#### Army

- 1928 Simard, René, F. O.

### CHINA

#### Army

- 1916 Wong, Tsou, *Lt. Gen.*
- 1927 Wang, Shi Cho, *Col.*

#### Navy

- 1915 Mar, Pellian T. C., *Rear Adm.*
- 1917 Yeh, Frank, *Capt.*

### GREAT BRITAIN

#### Navy

- 1942 Bruckmann, Paul M. W., *S. Lt.*
- 1943 van Voorhees, Richard M., *Asst. Ord. Ins.*

### CHANGES IN RANK

#### U.S.A.

- 1910 Cleverdon, Herbert S., *Maj. to Lt. Col.*
- 1913 Achard, Francis H., *Capt. to Maj.*
- 1915 Worthington, Harold, *1st Lt. to Capt.*
- 1916 Kelley, John A., *Lt. to Capt.*
- 1917 Groves, Leslie R., Jr., *Brig. Gen. to Maj. Gen.*
- 1919 Litehiser, Robert R., *Lt. Col. to Col.*
- 1920 Carleton, Charles D., *Maj. to Lt. Col.*
- 1921 Kerrigan, Ambrose L., *Maj. to Lt. Col.*
- Noce, Daniel, *Brig. Gen. to Maj. Gen.*
- 1922 Peabody, Elliott G., *Capt. to Maj.*
- 1923 Flaherty, John C., *Capt. to Maj.*
- Meekins, Raymond M., *Maj. to Lt. Col.*
- 1926 Skinner, Asa H., *Lt. Col. to Col.*
- Hill, Kenneth E., *Capt. to Maj.*
- Humphreville, Bruce T., *Maj. to Lt. Col.*
- 1927 Sackville, William, *Maj. to Col.*
- Warren, Elmer C., *Capt. to Maj.*
- Akerman, Amos T., *Lt. Col. to Col.*
- Gerhardt, William R., *Maj. to Col.*
- 1928 Carey, Albert J., *Capt. to Lt. Col.*
- Thomas, Huguenin, Jr., *Maj. to Lt. Col.*
- 1929 Barnett, Howard L., Jr., *Maj. to Lt. Col.*
- Foley, Daniel T., *Lt. to Maj.*
- Goldsmith, Lloyd T., *1st Lt. to Capt.*
- 1930 Child, Josiah H., *Capt. to Maj.*
- 1931 Bertollett, Arthur D., *Maj. to Lt. Col.*
- Harrison, William D., *Maj. to Lt. Col.*
- Kohler, Otto C., *Capt. to Maj.*
- Martel, Charles W., *Lt. to Capt.*
- 1932 Badgett, Edward D., *Capt. to Maj.*
- Crowe, William J., *Lt. Col. to Col.*
- Foster, Willard H., *Maj. to Lt. Col.*
- Hinrichs, John H., *Maj. to Lt. Col.*
- Vassalotti, Louis J., *Capt. to Maj.*
- Williams, Myron L., *Capt. to Maj.*
- 1933 Spilhaus, Athelstan F., *Capt. to Maj.*
- 1934 Daleda, Joseph, *Maj. to Lt. Col.*
- Hammonds, G. Scott, *Capt. to Maj.*
- 1935 Brown, Samuel P., *Capt. to Maj.*
- Loomis, Wesley H., *Capt. to Maj.*
- 1936 Peterson, Carl M., *Capt. to Maj.*
- Rapoport, Emanuel, *Pvt. to O. C.*
- Benson, Robert E., *Capt. to Maj.*
- Kieley, Thomas J., *Lt. to Capt.*
- Stroker, James F., *Capt. to Lt. Col.*
- Swift, Allan M., *Capt. to Maj.*
- 1938 Betts, Austin W., *Capt. to Lt. Col.*
- Phinizy, W. Harison, *Capt. to Maj.*
- Torrans, David J., *2nd Lt. to 1st Lt.*
- 1939 Baldwin, Woodson W., Jr., *Lt. to Capt.*
- Deering, Roland C., *Pvt. to T. 3c.*
- Dodge, John A., *Lt. to Capt.*
- Ellis, Noel H., *Lt. to Lt. Col.*
- Murphy, William A., Jr., *Capt. to Maj.*
- Stuart, Alexander J., Jr., *Maj. to Lt. Col.*
- 1940 Baird, James H., *Pvt. to 2nd Lt.*
- Bucklin, Albert G., *Pvt. to Corp.*
- Bushloff, Harry, *Capt. to Maj.*
- Stewart, Robert W., *Lt. to Maj.*
- 1941 Aborn, Gage N., *Capt. to Maj.*
- Bensusan, Albert L., *Lt. to Capt.*
- Clark, George W., *Capt. to Maj.*
- Jessup, Bob A., *Lt. to Maj.*
- Koch, Raymond F., *Lt. to Capt.*
- Sage, Nathaniel M., Jr., *Lt. to Capt.*
- Stewart, Carlton M., *S. Sgt. to 2nd Lt.*
- 1942 Badger, Theodore J., *A. C. to 2nd Lt.*
- Davison, John P., *Pvt. to 2nd Lt.*
- Hoffman, Theodore F., *Lt. to Capt.*
- Poole, Robert T., *2nd Lt. to Capt.*

- Shackley, Frederic, *Cadet to 2nd Lt.*
- Walk, William E., Jr., *Capt. to Maj.*
- 1943 Cole, Richard J., A. C. to Lt.
- Lephakis, Achilles J., A. C. to 2nd Lt.
- Shoffner, Myron A., *Cadet to 2nd Lt.*
- Wadsworth, Francis J., *2nd Lt. to 1st Lt.*
- Walz, Hans G., *Corp. to 2nd Lt.*

### U.S.N.

- 1910 Chantry, Allan J., Jr., *Capt. to Rear Adm.*
- 1918 Flint, James A., *Lt. Comdr. to Comdr.*
- 1922 Halpin, John F., *Lt. Comdr. to Comdr.*
- 1924 Stump, Felix B., *Capt. to Rear Adm.*
- 1926 Murphy, William J., *Comdr. to Capt.*
- Pride, Alfred M., *Lt. Comdr. to Rear Adm.*
- 1928 Chamberlain, John W., *Lt. Comdr. to Comdr.*
- Holderness, George A., Jr., *Comdr. to Capt.*
- 1932 Clark, William S., *Ens. to Lt. (j.g.)*
- 1933 Kingsland, Lawrence C., Jr., *Lt. (j.g.) to Lt.*
- 1935 Helwith, Edward E., A. S. to S.1.c.
- 1938 Baron, Sidney, *Ens. to Lt. (j.g.)*
- Schorsch, Allan E., *Ens. to Lt. (j.g.)*
- 1939 Knoll, Denys W., *Lt. Comdr. to Capt.*
- Loesch, Richards L., Jr., *Lt. (j.g.) to Lt.*
- Thackara, Alexander M., *Ens. to Lt. (j.g.)*
- 1940 Fifield, James E., A. S. to Mid.
- Smith, Arnold R., *Ens. to Lt. (j.g.)*
- 1941 Cumberledge, Arthur A., *Lt. Comdr. to Comdr.*
- 1942 Elrod, Harold G., Jr., *Ens. to Lt.*
- Schwartz, Charles W., *Ens. to Lt. (j.g.)*
- Taylor, Maurice E., *Ens. to Lt. (j.g.)*
- 1943 Ernst, Edward E., S.2.c. to S.1.c.
- Rorschach, Robert L., *Mid. to Ens.*
- Townsend, Robert L., *Lt. to Lt. Comdr.*

### U.S.M.C.

- 1924 Bartlett, Ralph W., *Sgt. to Plt.*
- 1943 Robison, Herbert S., *Pvt. to 2nd Lt.*

### CASUALTIES

- 1937 †Wirtz, Elmer C., *Lt.*, U.S.A. Bataan. (Previously reported missing in action.)
- 1938 †Burke, John G., *Lt.*, U.S.A. Germany.
- \*Thau, William, *Capt.*, U.S.A. Accidental death in line of duty.
- 1939 †Merrill, Leonard A., Jr., *Lt.*, U.S.A. Anzio Beachhead.
- 1941 †Wiener, Richard S., *Lt.*, U.S.A. Italian theater.
- 1942 †Larkin, James J., *Capt.*, U.S.A. Italian theater.
- \*Reed, Harold M., *Lt.*, U.S.A. Died in European theater while on active duty.
- 1943 ★McGrath, Thomas E., *Ens.*, U.S.N. Pacific theater.

### NOT MISSING

Leon Crane, Jr., '41, 1st Lt., U. S. A., whom the April Review reported "Missing in Action" in Alaska, returned to Ladd Field at Fairbanks on March 14 after having spent 84 days in the Alaskan wilderness. An account of his experience appears in the "Institute Gazette" in this issue.

★ Killed in Action.

† Missing in Action.

‡ Prisoner of War.

\* Died in Service.

\*\* Wounded.

## ALUMNI AND OFFICERS IN THE NEWS

## Honors

¶ For HERBERT S. BIRD '88 and HARRY E. SMITH '87, who received diplomas from the American Chemical Society for a membership of 50 years.

¶ For WILLIS R. WHITNEY '90, who on April 14 was made an honorary member of the Electrochemical Society, one of his most notable achievements being proposal of the electrochemical theory of corrosion, which is now universally accepted.

¶ For WILLIAM D. COOLIDGE '96, who on April 19 was awarded the Franklin Medal for 1944, "in recognition of his scientific discoveries, which have profoundly affected the welfare of humanity, especially in the field of the manufacture of ductile tungsten and in the field of improved apparatus for the production and control of x-rays."

¶ For FRANK B. JEWETT '03, who on March 13 received an honorary doctor of science degree from Boston University.

¶ For HUDSON HOAGLAND '24, who has been appointed to a Guggenheim Memorial Fellowship. Project: a study of the physiology of psychotic patients.

## Silver Tongues

¶ CHARLES M. SPOFFORD '93, speaker for one of a series of lectures at the Boston Public Library sponsored by the City Planning Board, favored "a belt line under public control to connect rail lines and waterfront facilities and 'adequate' freight-handling equipment" to develop the port of Boston.

¶ SARAH HALL BONESTEELE '94, before the Colonial Coverlet Guild of America on March 22, traced the history of our homemade, domestic rugs of early times to an origin in the Far East.

¶ EDWARD H. DAVIS '01 spoke on March 16 before the Bridgeport, Conn., chapter of the National Association of Cost Accountants on "Cost Problems in a Post War Economy."

¶ GORDON G. HOLBROOK '10 delivered an address on the part management should play in the shipyard safety program, at the opening session on March 28 of the East Coast Shipyard Safety Conference in New York.

¶ RALPH T. WALKER '11 and ROYAL BARRY WILLS '18 gave two of the six lectures presented in Boston under the auspices of the Boston Society of Architects, the Massachusetts Association of Architects, and the Boston Architectural Club. Mr. Walker spoke on "The Architect's Relation to the

City"; Mr. Wills, on "Houses of Today and To-morrow."

¶ RAYMOND STEVENS '17 discussed "the more extensive and effective use of fundamental and applied research . . . in the postwar period" at a symposium on the postwar chemical outlook at the 107th national meeting of the American Chemical Society in Cleveland on April 4.

¶ HAROLD W. BIBBER '20 gave a General Electric science forum address in April on "Scientific Research in Japan."

¶ AVERY A. MORTON '24 read a paper on organo-alkali compounds at the March 13 meeting of the north Jersey section of the American Chemical Society.

¶ JAMES H. CARR, JR. '36 discussed "Wood in the War Effort" before the Engineers Club in Charlotte, N.C., on December 6.

¶ FRANCIS R. MEISCH '40 spoke on "Airport Planning in Conjunction with Community Needs" before the Milwaukee Co-operative Club on March 8.

## Mighty Pens

¶ THEODORE B. PARKER '11: "TVA River Engineering" in the *Journal* of the Boston Society of Civil Engineers for January.

¶ EDWIN S. BURDELL '20: "Prewar Engineering Schools in a Postwar World," in the *Journal of Engineering Education* for December.

¶ ERIC HODGINS '22: "A Definition of News for the World of Tomorrow" in the *Journalism Quarterly* for December.

¶ HAROLD H. STAEBNER '27: "Tinsel for Navy Telephones" in the *Bell Laboratories Record* for March.

¶ CARL F. FLOE '35 and MICHAEL B. BEVER '42: "Solubility of Hydrogen in Molten Copper-Tin Alloys"; JOHN H. HOLLOMON '40: "The Notched-bar Impact Test" — in the *Journal* of the American Institute of Mining and Metallurgical Engineers for April.

## DEATHS

\* Mentioned in class notes.

¶ REGINALD H. WESSON '85, February 23.

¶ FREDERICK R. YOUNG '86, in 1943.

¶ WILLIAM B. BLAKE '87, April 6.

¶ ADDISON D. NICKERSON '88, December 4.\*

¶ GEORGE A. ORROK '89, April 6.

¶ MINNIE H. ROGERS '90, March 20.\*

¶ EDWARD B. STEARNS '90, January 6.\*

¶ WILLIAM H. LANE '92, February 21.

¶ RUSSELL SELFRIDGE '92, March 23.

¶ HOWARD A. GILSON '93, January 13.

¶ FRANKLIN H. ROBBINS '94, March 12.\*

¶ S. ANTHONY SAVAGE '94, March 5.\*

¶ THOMAS W. BAILEY '96, November 18, 1942.\*

¶ EUGENE H. LAWS '96, March 19.\*

¶ WILLETT A. WOOD '96, March 5, 1943.\*

¶ ASA W. GROSVENOR '99, May 10, 1943.\*

¶ JOHN BROWN '00, March 19.

¶ RALPH STEVENS '00, June 28, 1942.\*

¶ WILLARD W. STONE '00, February 11.\*

¶ ALLEN L. APPLETON '02, February 26.\*

¶ GARRET S. CANNON '04, November 29, 1942.\*

¶ LEWIS C. CLARKE '04, November 18.\*

¶ ARTHUR H. EATON '04, February 22.

¶ GEORGE W. SANBORN '04, January 13.\*

¶ FRANCIS T. SCANNELL '04, February 25, 1943.\*

¶ WILLIAM H. BEERS '05, January 18.\*

¶ MORRIS H. WHITEHOUSE '05, April 4.

¶ EUGENE P. CHASE '06, October.\*

¶ SIDNEY L. DAVIS '06, March 29.

¶ RALPH H. CROSBY '07, June 18, 1943.

¶ OTTO A. JOHNSON '07, March 8.\*

¶ AARON R. MERRITT '08, December 18.

¶ ALLAN SEYMOUR '08, July 30.

¶ LEAVITT W. THURLOW '08, March 11, 1941.\*

¶ HENRY T. GIDLEY '09, March 3.\*

¶ ROBERT L. DODGE '10, April 4.

¶ CHARLES E. GREENE '10, March 8.\*

¶ LEWIS W. WATERS '10, March 31.

¶ CLAYTON S. ROBINSON '11, March 10.

¶ WILLIAM CLIFT '21, July 28.

¶ FREDERICK M. GAHAGAN '21, July.

¶ YSSEL Y. YOUNG '21, April 2.

¶ RALPH D. CARLETON '22, January 23.\*

¶ STANLEY E. CLIFF '22, February 25.\*

¶ HAROLD J. ACTON '23, January 29.

¶ JOHN STORM '23, January 23.\*

¶ ISAAC BRIMBERG '24, November 24.\*

¶ FRANK O. POTTER '27, September 21.

¶ JOHN J. COLLINS, JR., '28, March 30.

¶ JOHN M. LANE '32, June 23.

¶ NORMAN I. PAULSEN '33, June 28.

¶ HOWARD A. STANLEY '34, October.

¶ MILTON FREEDSON '37, September 10.\*

¶ JAMES H. FERGUSON '41, January 5.\*

¶ DOUGLAS W. JOHNSON, former staff, February 24.

¶ ELMER H. PETERSON, staff, February 28.



## NEWS FROM THE CLUBS AND CLASSES

## CLUB NOTES

*A.I.M.E.*

The M.I.T. was well represented at the annual meeting of the American Institute of Mining and Metallurgical Engineers held in New York from February 20 to 24. Among those who presented papers, many of whom appeared more than once on the program of events, were the following: Antoine M. Gaudin, Richards Professor of Mineral Dressing; Carl F. Floe '35, Associate Professor of Physical Metallurgy; Eugene F. Poncellet, former Guest of the Institute; Michael B. Bever '42, assistant in the Department of Metallurgy; Robert G. Hall '97, Guy C. Riddell '04, John L. Bray '12, Arthur F. Taggart '13, Raymond Mancha '26, Robert Henderson '30, Herbert H. Uhlig '32, Richard F. Miller '34, Frank R. Milliken '34, James R. Long '35, Rolland S. French '38, James P. Pollock '38, John H. Hollomon '40, Henry G. Poole '41, Frank W. Bowditch '43, Kenneth C. Vincent '43, and Risto T. Hukki '44.

Other Technology people prominent at the meetings included: John Chipman, Professor of Process Metallurgy; John Wulff, Associate Professor of Physical Metallurgy; Charles E. Locke '96, Professor of Mining Engineering and Ore Dressing, emeritus; Gerald F. Loughlin '03, Elmer A. Holbrook '04, William D. B. Motter, Jr. '05, Winthrop P. Haynes '11, Philip B. Bucky '20, James R. Cudworth '21, Walter Crafts '26, Cyril S. Smith '26, Thomas S. Washburn '26, Henry W. Hitzrot '28, Norman D. Fitz Gerald '31, John T. Sherman '31, and Karl L. Fetter '40.

Awarded certificates in the Legion of Honor, as having been members for 50 years, were Elwood J. Wilson '86, Philip A. Mosman '87, and Ralph H. Sweetzer '92.

*Southwestern Association of M.I.T.*

On February 28 the Association held a dinner meeting at the Hotel President in Kansas City, Mo. In spite of the fact that this meeting occurred but three weeks after our smoker, there was a good attendance of 32 members — including several present for the first time — as well as six prospective students and the vice-principals of 12 schools. Paul M. Chalmers, Assistant Director of Admissions at the Institute, delivered an interesting talk on how Technology is being operated under wartime conditions. He illustrated his remarks with movies in color, adding much valuable comment in the vein of Burton Holmes.

Following Professor Chalmers' address, Dixie Kiefer '29, who was graduated from Annapolis in 1918, told us in very informal style about his experiences while serving as executive officer of the U.S.S. *Yorktown* during this carrier's gallant career of some five months in the Pacific. Since space and my

writing ability are both inadequate to a just reproduction of Captain Kiefer's remarks, I should like to pass a word of advice to the Secretaries of all local alumni clubs: If Dixie Kiefer ever comes into your territory, make his acquaintance at once. — REGINALD W. BULKLEY '27, *Secretary*, 840 Westover Road, Kansas City 2, Mo.

*Technology Club of Philadelphia*

The first dinner meeting of the year was held at the University Club in Philadelphia on March 9, with 110 members present. Our genial President, Ed Healy '23, presided. At a short business meeting after the dinner a nominating committee was appointed to select officers for the new year, and a \$50 contribution to the Alumni Regional Scholarship Fund was voted. The Treasurer's annual report, for reasons none could explain, showed a healthy balance, but steps will be taken to remedy this condition.

C. A. Sienkiewicz, Vice-president of the Federal Reserve Bank of Philadelphia and chairman of the Philadelphia research committee of the Committee for Economic Development, was introduced as guest speaker by Herb Anderson '15. Mr. Sienkiewicz presented some up-to-the-minute material and facts on planning for the postwar period. In his opinion, postwar planning must be predicated on three basic principles: (1) quick settlement of war contracts; (2) speedy but orderly disposal of surplus materials; (3) rapid removal of war materials and machines from private plants to prepare for peacetime manufacturing. He stated that 55,000,000 jobs must be provided after the war and that a national income of at least \$140,000,000,000 must be attained if we are to be assured of prosperity.

The guest speaker was followed by the ever welcome H. E. Lobdell '17. The Dean outlined present-day conditions at the Institute, and the many vexing problems to be met and overcome, interspersing his talk with many humorous sidelights in typical Lobdell fashion.

W. H. McCallum '24 related incidents of the Alumni Day Dinner in Boston on February 26, followed by F. J. Chesterman '05, President of the Alumni Association and member of the Club, who talked briefly on the activities of the Association. — GEORGE T. LOGAN '29, *Secretary*, 1000 Chestnut Street, Philadelphia, Pa. HENRY F. DALEY '15, *Review Secretary*, B. F. Sturtevant Company, Cresmont and Haddon Avenues, Camden 4, N.J.

*Technology Club of Rhode Island*

For its annual ladies' night the Club held a dinner at the Crown Hotel in Providence on March 7. After dinner the party adjourned to the Rhode Island Auditorium to witness an American Hockey League game between Providence and Buffalo. The next

meeting was the popular dinner at the Anawan Hunt Club in Rehoboth, Mass., on April 20. — DONALD E. WALCH '22, *Secretary*, General Electric Company, 111 Westminster Street, Providence, R.I.

*Technology Club of St. Louis*

The Club held its first meeting of the season on February 10 in the Tower Room of the Congress Hotel. Our President, Alexander J. Pastene '13, presided, and 45 members attended. After an excellent dinner we had the fine treat of hearing Samuel C. Prescott '94 as guest speaker. We are indeed grateful to Dr. Prescott for making the special trip from Chicago to be with us. He told of the activities and problems at the Institute since war began and predicted that when all the facts can be divulged, Technology would be outstanding for its achievements during this war.

Another M.I.T. visitor in St. Louis, Paul M. Chalmers, Assistant Director of Admissions at the Institute, was entertained at the Missouri Athletic Club by Eugene S. Weil '21, as host, and a group of members including President Pastene, G. C. Bradshaw '24, C. M. Dean '17, S. F. Gordon '23, and D. Q. Wells '30, all of whom enjoyed and profited from the opportunity to see Professor Chalmers.

At this time we wish to extend the hope of an early and safe return for our many members who are in the armed services and especially for Elmer C. Wirtz '37, an Army lieutenant now imprisoned at Bataan. — JAMES J. MAZZONI '31, *Secretary*, 7012 Clayton Road, Richmond Heights 17, Mo.

*Washington Society of the M.I.T.*

The Society met on March 9, the second Thursday, at the Y.W.C.A. on 17th and K Streets for its 6:15 dinner meeting, with the usual large attendance. Our speaker was Bradley Dewey '09, rubber director for the War Production Board and son of our old Professor, Davis R. Dewey. Colonel Dewey gave a most interesting talk on synthetic rubber and the numerous problems involved "with five balls in the air at all times." He discussed the many ways in which various phases of the problems were interdependent and reported the progress that had been made. His lantern slides of large synthetic plants throughout the United States were very interesting. As his talk was strictly off the record, we cannot report it, but those present enjoyed an unusual opportunity.

The Technology men who attended included the following: 1889: G. W. Stone; 1890: J. G. Crane, W. B. Poland; 1892: B. P. Du Bois; 1896: W. E. Haseltine, M. O. Leighton, Bradley Stoughton; 1897: P. L. Dougherty, F. A. Hunnewell, H. M. Loomis; 1898: Martin Boyle; 1900: S. W. Jones, H. C. Morris; 1901: W. L. Cook, W. F. Davidson; 1904: M. L. Emerson, H. H. Groves, F. W. Milliken, G. H. Shaw, G. N. Wheat; 1906: R. R. Patch, A. L.

Sherman; 1909: E. D. Merrill, M. R. Scharff, J. W. Nickerson; 1911: D. P. Allen, E. R. Hall, C. P. Kerr, W. H. Martin, C. G. Richmond, E. D. Van Tassel, Jr., A. W. Yereance; 1912: F. W. Barker, R. E. Wilson; 1913: L. W. Parsons; 1915: A. D. Beidelman; 1916: W. H. Blank, H. F. Dodge, Dexter North; 1917: J. P. Ferrall; 1918: H. D. Manuelian; 1919: A. H. Blake, L. J. Grayson, M. P. Smith; 1920: John Nolen, Jr.; 1921: Richard McKay, W. T. Smith; 1922: H. H. Fisk, J. F. Hennessy, W. K. MacMahon, S. H. Manian, C. B. Miller, C. A. Moore, J. R. Morton, Jr.; 1923: H. L. Bond; 1924: David Evans, J. E. Jackson, L. F. Porter, W. W. Sturdy, M. N. Waterman; 1925: C. R. Mabley, Jr., K. C. Reynolds; 1926: S. J. Cole, E. W. Eddy, Shepard Vogelgesang; 1927: E. G. Cowen, D. F. Horton, M. D. James; 1928: A. E. Beitzell, J. W. Gaffney, M. W. Keyes, G. D. Mock; 1929: J. C. Coe, J. A. Plugge, N. P. Stathis, F. W. Turnbull; 1930: A. F. Bird, C. W. Maskell, J. A. Mathews, N. C. Nelson; 1931: E. S. Worden, Jr.; 1932: C. D. Cummings, W. H. Foster, S. D. Miller, R. S. Prescott; 1933: C. W. Bohrer, J. F. Longley; 1934: J. F. Burke, A. A. Rostartchuk; 1936: C. E. Crede, B. W. Lowe, G. D. Mylchreest; 1937: J. F. Keithley; 1938: Richard Muther; 1940: M. A. Copeland; 1941: W. J. Meyers; 1942: M. R. Brown, Z. W. Wilchinsky. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. WILLIAM K. MACMAHON '22, *Review Secretary*, Rosslyn Gas Company, 3240 Wilson Boulevard, Arlington, Va.

### M.I.T.\*at Lockheed

According to Bernard Dale '43, a Technology group known as the "Lockheed M.I.T. Men," employees of the Lockheed Aircraft Corporation in California, meets regularly. The last meeting was a dinner at the Sky Room restaurant at the Lockheed Aircraft terminal. Mac Short '26, Engineering Vice-president of Lockheed, gave some interesting reminiscences, and two movies about the S-1 bomb sight were shown.

## CLASS NOTES

### 1869

Ezra F. Taft, who is the sole surviving member of the Class and the second oldest alumnus of Technology, observed his ninety-eighth birthday on March 30 at the home of his son, Fletcher W. Taft, with whom he lives at 4 Upland Road, Lexington. Dr. Taft is not only the second oldest alumnus of the Institute but also the oldest living graduate of Amherst College and of the Harvard Dental School. He was born in Dedham and for 50 years was a dentist in Cambridge and for a number of years an instructor in the Harvard Dental School. He is the father of Theodore H. Taft '01, who is an Associate Professor in the Department of Mechanical Engineering at the Institute. Another son is Robert B. Taft of Belmont, a Boston dentist. Owing to the frail health of Dr. Taft, his birthday celebration was limited to the family circle.

### 1888

Following the example of Lowell Thomas, the famous radio commentator

who travels around the country broadcasting from wherever he happens to be, your Secretary is sending this from "deep in the heart of Virginia" at Staunton, in the Shenandoah Valley between the Blue Ridge and Allegheny Mountains, where he has been visiting his daughter and her husband, E. C. Mayer. Lieutenant Commander Mayer, United States Navy, retired, is now instructor in Spanish and lecturer on leadership at Staunton Military Academy. This is a beautiful spot with the mountains all around and the academy buildings on top of a hill. Your Secretary has visited the birthplace of Woodrow Wilson, a national shrine, and has sat in the chair President Roosevelt sat in when the house was dedicated three years ago.

Also in Virginia, George Roper, winner of the mile run at Lynn in 1886, writes from his grand Colonial mansion in Norfolk: "In reply to your inquiry, 'How is Norfolk?' I should say that Norfolk rose nobly to the occasion and has handled very capably a 100 per cent increase in population dumped on her without notice. There were not, of course, apartments or houses for all the newcomers at once, but they were shortly forthcoming. With advance notice of the extent of the migration, facilities might have been ready. And of course, as in any city, one is not always able to get a seat on a bus. But Norfolk has done her utmost to make every stranger comfortable and happy. If you could hear the British sailors each midnight singing as they leave their club at the end of our street, you would be convinced of the feeling prevalent in the multitude of clubs and places of diversion that have been opened, especially for those in the armed forces. Hospital patients are well taken care of, and everyone is contributing books and games for their diversion. . . ."

Your Secretary has just received the following clipping from the New York *Herald Tribune* concerning Addison Nickerson, an outstanding engineer, who was graduated with us in Civil Engineering but was never able to attend our class dinners or reunions: "Addison Doane Nickerson, civil engineer, who supervised the laying out of Beachwood, N.J., in 1915, died [December 4] at the home here of his son, Robert Nickerson, 570 Cherry Street [Elizabeth, N.J.]. He was seventy-five years old and lived on Clubhouse Road, Beachwood. Mr. Nickerson supervised the development of Beachwood from a pine forest into a thriving summer resort. Among projects he supervised were the Ashokan Dam in Ulster County, New York, and the dam at Keokuk, Iowa. He went to Beachwood in 1914 at the request of the late Bertram C. Mayo, promoter of the resort project, and became its first resident. Later, during the days of the community's early development, he was commissioner for the borough. Surviving, besides his son, are his wife, Mrs. Minnie Nickerson; two brothers . . . and a sister. . . ."

After three or four weeks in Newport, R.I., your Secretary expects to be at Chebeague by May 7. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston 15, Mass.

### 1890

Our Secretary, having recently obtained the necessary priorities, has flown to Mexico, where he expects to be for some weeks inspecting and reporting on important mining projects. Our best wishes to George for a successful trip and a safe return.

At the annual Alumni Banquet held at the Hotel Statler on February 26, our Class was well represented. Gathered around our table were Burley, Crane, Goodwin, Greenlaw, Lenfest, Packard, Roots, and Sherman. The advisability of holding a special 55-year reunion next year was discussed, but it seemed to be the general opinion that with traveling conditions as they are at present, very few living at a distance would be able to attend. The situation may, however, so change between now and June, 1945, that a get-together of the Class will be practicable.

The following item should have appeared in the March notes: Arthur B. Stearns retired from active work last summer and was presented with a beautiful brass barometer and other gifts by his friends and associates in the Bath Iron Works. He is also reported to have a life membership in the Association of Designers. Shortly before our Secretary left for Mexico, he had the pleasure of a call from Stearns himself, who told him that, except for the 10 years immediately following graduation, when he was with the Bigelow Sanford Carpet Company at Framingham, he has ever since been at the Bath Iron Works in charge of the wiring of all their big ships. Our best wishes for a long and happy retirement.

Another interesting bit of news appeared in the *Christian Science Monitor* of December 3. One of the concrete ships recently launched by the McCloskey Company at Tampa, Fla., was named for our classmate, Leonard Chase Wason. This posthumous honor was in recognition of his contributions in reinforced concrete construction.

It is with deep regret that we have to announce the following deaths: Edward Burnham Stearns died January 6 in Montclair, N.J. He had retired from business in 1937 after serving for 35 years as sales manager of the New York office of the American Bridge Company. He is survived by his wife, son, and two daughters, to whom deepest sympathy is extended.

Minnie Hempel Rogers passed away on March 20 at the Boston City Hospital from an attack of pneumonia. During her last illness she received the best of care, thanks to her devoted friend, Charlotte Bragg, and other kind classmates. Dr. Frank White, at present on the hospital staff, saw that everything was done for her comfort. Our Rev. Willard Roots came from his home in Mansfield to the funeral and himself read the committal service at Forest Hills Cemetery. Miss Rogers was graduated in the Course in Architecture and for many years assisted in the Department of English and History and the Department of Economics at the Institute. She was always a most loyal alumna.

Word has been received from Butte, Mont., of the death of Mrs. Creden, the wife of our classmate, William L. Creden, who was chairman of the Montana Alumni Association of the M.I.T. The Secretary has



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expressed the sympathy of the Class. — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston 9, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 4-242, M.I.T., Cambridge 39, Mass.

## 1894

Time speeds on toward our fiftieth reunion which, unless changes have to be made suddenly, will be on the week end of June 9-12 at the New Ocean House in Swampscott. A letter will have been sent to the Class long before these notes are read.

As the Class of 2-44 was graduated at the end of February, according to the traditions of this modern era '94 was asked to participate. The Class Day exercises were held on Saturday afternoon, February 26, in the hall of the New England Mutual Life Insurance Company Building, which now occupies the land where Rogers and Walker stood in our day. The hall, with entrance on Clarendon Street, is in just about the spot where we worked in "phys lab" and listened to the lectures of Professor Cross '70. A part of the Class Day program is a brief address by a member of the 50-year Class. Alan Claflin represented us on this occasion, and his address, combining historical data of '94's days at the Institute and some sound philosophy for the seniors, was sparkling with wit and given in that whimsical-serious style of which Alan is a master. It was received with acclaim by all and warmly applauded by the members of '94 present, who were Mrs. Darragh de Lancey, E. M. Hunt, F. W. Lovejoy, W. H. King, and the Secretary.

At the Alumni Dinner that evening we had a well-placed table and a well-filled one, with Batson, Claflin, Hunt, King, Lovejoy, W. H. Pratt, Tenney, and Prescott, while Mrs. de Lancey sat with Alumnae at the next table. It was a most enjoyable occasion. On Monday morning, February 28, the graduation exercises for 2-44 occurred in Symphony Hall. As special guests on the platform, our Class was again a part of the event, and we were also special guests of President and Mrs. Compton at the luncheon which followed in Horticultural Hall. At the graduation exercises, in academic robes and hoods, we were marshaled by C. E. Locke '96 and followed immediately after the officials, speakers, and Corporation in the academic procession. Fourteen members of the Class participated in this event, which as usual was carried out with fine dignity and engineering efficiency. At the luncheon were King, Mrs. de Lancey and a daughter, Harry Hastings, Frank and Mrs. Lovejoy, Henry and Mrs. Warren, Harry and Mrs. Gardner, Henry and Mrs. Lacount, Claflin, Day, W. H. Pratt, Batson, Hunt, Chapman, and Prescott. Thus we helped start 2-44 off on its career.

F. H. Clarke now resides at 65 Glen Road, Wellesley 82, Mass. John Ferguson has become a Floridian and lives at 5416 Northeast First Court, Miami 38, but we hope New England will pull him back in time for reunion. Henry Edwards gives his present address as 230 Holley Street, Brockport, N.Y.; John Kittredge is located at 135 Sigourney Street, Hartford 5, Conn.; and Rev. Francis M. Adams has left good old Sabattus, Maine, and now claims Ridgefield, Conn., as his home. He should

contact Luther Nash, who also lives in that town.

The March 11 issue of *Science News Letter* carried an article on long-range forecasting of weather, the material for which was derived from the twelfth Arthur Lecture of the Smithsonian Institution given by Charles G. Abbot.

Unfortunately, no record relating to the Class in these latter years is free from necrology. During the month of March we suffered the loss of two of our members. On March 5, Silas Anthony Savage died at his home in Santa Paula, Calif., after a long illness. Savage retired from active work in February, 1941, and had since then been living in Santa Paula. A letter from his wife, who was a member of the class of '94 at Boston University, states that they had hoped to come East for their respective 50-year reunions. He had a very high regard for the Class, although unable to attend previous reunions. A graduate of the Chelsea High School, Savage took the Course in Mechanical Engineering and was well known and popular throughout his four years at Technology. For many years previous to retirement he was engaged in professional work in California but was earlier attached to the United States Lighthouse Board and had much to do with its developments along the Atlantic seaboard. He married Florence Clifford in 1895. There were two daughters, one of whom died in 1903. No information has reached the Secretary as to his work during the past 20 years.

Franklin Henry Robbins, also a graduate in Mechanical Engineering, died in New York on March 12. Robbins had been for many years a designing engineer with the board of water supply of New York City. His work was of a very high order, and he was held in greatest esteem by his colleagues. For his position there he had had admirable training, as after some drafting experience and two years of teaching at the Institute, he joined the Boston Metropolitan Water Board for several years as assistant to C. W. Sherman '90. He was later in the employ of the commission to investigate and plan additional water supply for New York City, and then went with the Pittsburgh Filtration Commission. When the actual work of building the great new water supply for New York was carried out, Robbins was one of the many engineers engaged, and his career was afterward identified with this great project and its continuous operation, until he reached retirement age a year or two ago. Robbins is survived by Mrs. Robbins and two sons. His impressive funeral was at the Funeral Church on March 15. Flowers were sent from the Class, and W. H. King attended as our representative. To the families of both of these men the deep sympathy of the Class is extended, and we record a sense of loss of two men of fine character and useful service.

We may finish this report on a more optimistic note. A letter from A. Maurice Robeson, written from his home, Little Weir House, Quarry Road, Marlow, Bucks, England, on February 14, was a heart-warming epistle, although he says: "No, nothing so marvelous as going over to Boston next June, but when the fates decree that the roads shall be opened and when the multitudes who are anxious to travel

can get their permits to move, America will be my first objective, with Beacon Hill as line of sight. We hope the '94 boys, who think nothing of roast chicken and all the delicious things such words call to memory, will see the deep regret that Mrs. Robeson and I have in not being able to join in that epicurean festivity you are preparing. We are both well and very happy in merely being alive and able to scratch together (and to cook) enough to keep well and strong. You may remember that when we met in London in 1938, we had just come over from Paris to spend a few weeks of the summer on the Thames at Marlow, where we had taken a house. The next summer we bought the place and moved in for the (expected) duration, as we were convinced that the war was about to start. It has been a good hole to crawl into, reasonably safe, yet near London. We fortunately brought most of our best things with us from Paris, and unfortunately left the rest in our apartment there, so we might cancel those out, as it is not possible to say what we shall find over there other than rubble. I hope you will have a good muster of '94 men and that many interesting experiences will be told that can later be recounted to the rest of us who cannot join the party."

— SAMUEL C. PRESCOTT, *Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

## 1895

In order to stimulate interest in the Alumni Dinner held on February 26, cards were mailed to 20 of our Class who live in Boston and vicinity. The five men responding were E. C. Alden, Albert Geiger, Samuel P. Hunt, Henry D. Jackson, and L. K. Yoder. Jackson deserves the medal for attendance, as he appeared with a badly strained back, requiring two days to make the return trip home. He was most cheerful, however, and felt repaid for his efforts when he heard the interesting and instructive talk by Paul Hoffmap. Sammy Hunt and Eddie Alden bear up well for their years. Al Geiger looks and feels as young as he did at the 35th reunion.

We had the honor of dining with a group of most amiable '97 men, comprising William Binley, Charles H. Eames, Walter Humphreys, E. R. Olin, and H. E. Worcester. A questionnaire is being compiled for distribution to our '95 men, to determine the character and location of the 50th reunion in 1945. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

## 1896

Rockwell made one of his periodic visits to Tennessee, leaving Boston on March 20 and returning on March 26. He took Mrs. Rockwell along with him as far as New Jersey and left her there while he went on to Tennessee. — E. M. Bragg, professor of naval architecture and marine engineering at the University of Michigan in Ann Arbor, writes that he has just gone on the retired list. At present he is using his leisure time to write a couple of papers from material that he has had in his head for a long period. His attitude, which is very sound, is that even though a man is retired he should keep busy at something.

As Bradley Stoughton never made good on his promise to supply further authentic

1896 Continued

information on Stoughton Night, there is nothing to add to the unauthentic account which appeared last month. — The Secretary has learned through the grapevine route that Joe Clary was in Boston on February 25, but he did not make his appearance known to the Secretary, and as far as the Secretary can learn, he did not get in contact with any member of the Class in Boston. All of which makes us wonder whether he has any antipathy toward Boston classmates.

Another contribution from Myron Fuller on the subject of hurricanes tells of his experience in the New England hurricane of six years ago. His most vivid recollection of it is that one minute he looked out at his garage at his camp in North Easton, and when he turned his head in that direction a moment later, his garage had disappeared.

The Secretary has received from Charlie Tucker the sad news that Gene Laws passed away on March 19 at the Burbank Hospital in Fitchburg, Mass. Services were held at Ashburnham on March 22, and were attended by Tucker and his wife and by Lythgoe and his wife. Tucker had written the Secretary about two weeks previous that Laws was entering the Burbank Hospital for observation and possible minor operation. The Secretaries sent Gene a personal message on the eve of the operation. Full details are lacking, except that Tucker states that the final cause of death was pneumonia which followed the operation. Additional information may become available for the next issue.

Memoir 1374 of the American Society of Civil Engineers has recently appeared and gives detailed information on the career and accomplishments of Thomas W. Bailey, whose passing on November 18, 1942, has already been mentioned in the class notes.

Through the kindness of Vernon C. Wood, brother of our late classmate Willett A. Wood, additional information has been received on the life activities of Willett. After being graduated from the Course in Electrical Engineering, he started developing special electrical equipment for detecting fires in all types of buildings and automatically relaying them to fire headquarters. He soon became engineer for the Clergue Power and Paper Company of Sault Ste. Marie, Ontario. With the rapid development of electrical interurban railway systems throughout the United States, he became chief engineer of the Detroit United Lines, which operated many interurban lines out of Detroit, Mich. Later he was chief engineer of the Blue Grass Traction Company of Lexington, Ky. In later years he became president of the Michigan Railway Guide Company of Detroit, one of the enterprises of his father, and with his brother, Vernon C. Wood, also an engineer, founded the Wood-Detroit Manufacturing Company, manufacturers of special nonferrous castings and metal specialties. He continued actively as president and treasurer until his illness, which was of long duration. He is survived by his brother and his sister, Mabel L. Wood, both of Detroit. His brother testifies that all through the years Willett was a booster for M.I.T. and that all at Technology had a kindly place in his heart. He liked to tell of the great days he had at the Institute

and the loyal friends he made there. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

## 1899

With due consideration of all factors involved in arranging a reunion, it was finally decided to step up the celebration of the 45th anniversary of our graduation from June to February, and to attend the Alumni Association Dinner in a group. The turnout exceeded the expectations of Miles Sherrill, Arthur Hamilton, and Hervey Skinner, who were the moving spirits behind the affair, but did not exceed mine. I got one of their letters.

The Class responded 19 strong: Arthur Brown, John E. Congdon, George C. Glover, Arthur L. Hamilton, W. A. Kinsman, Ralph W. Loud, H. S. Mork, Albert F. Nathan, W. S. Newell, Albert S. Perkins, Miles S. Richmond, Burt R. Rickards, T. P. Robinson, Edwin F. Samuels, E. R. Sheak, Miles Sherrill, Hervey Skinner, F. B. Stearns, and P. W. Witherell. Men traveled from Maine and Maryland, New York, New Jersey, Massachusetts, and Rhode Island. They gathered at Hervey Skinner's laboratory, where they drank each other's health in the hour preceding dinner, renewed old ties, and brought each other up to date as much as might be. Several who could not attend wrote to me and to the committee. From all sources we have news of the men of '99 and what they are doing.

Frank F. Fowle is a consulting engineer in Chicago. Though extremely busy, he takes time out for organization work. He presented a paper on the 100th anniversary of the first steamboat on the great lakes before the Western Society of Engineers, a paper which I found of considerable interest. This is a companion article to Fowle's former one on the "Original Rock Island Bridge Across the Mississippi." — C. A. Smith, superintendent of the Georgia Power Company, roadway department, had been north a short time since, so could not come again. He reports a thriving Atlanta Alumni Association of the M.I.T., with some 28 persons present at a baked-bean dinner at his home not long ago. — Lawrie Turner is chief chemist of the Georgia department of mines, mining, and geology, division of conservation. It is a service for the people of the state. Landowners, farmers, miners, collectors, and so on, bring it their problems and discoveries.

Frederick Waddell sent regrets from Chicago, where he is on special assignment for war construction for a few months. He and W. A. Hazard are still with Bethlehem Steel in Pennsylvania. Waddell has five grandchildren whose company he enjoys when he can, and for relaxation he plans the trips he will take after the war if anyone has any money and if there is any gas.

Arthur Little Hamilton has been serving as representative of his district in the New Hampshire legislature and is a member of the New England aviation cadet committee, procuring men for Army and Navy cadet training. — Burt R. Rickards is with the New York State Department of Health in Albany, serving as director of the division of public health administration. He has

lectured at Technology on public health, but this series is now being discontinued for the duration. In addition he is on the lecture staff of the DeLamar Institute of Public Health and the Albany Medical College, and served as chairman of the New York State advisory committee on home and farm safety. Besides being class agent, he is an honorary secretary of the M.I.T. and interviews prospective students.

From John Congdon we learned that his son Roger '33 is business manager of the Doelcam Machine Tool Company, West Newton, Mass. John lives in Providence. His ancestors settled in South County, R.I., in 1660. — Harold Graves has been living in Brookline. — Gardner Barry wrote in from Sandwich that he had done grand jury service for four months in 1943. — Edwin F. Samuels of Baltimore joined the Maryland Minute Men, which disbanded when it appeared there wasn't a chance of even a paratroop attack. Samuels took time out to go to the reunion, even though he was going to Florida for a fortnight or so the first of March.

Arthur E. Blackmer of the Plymouth, Mass., water department was in Florida for the winter, and so was Ben Morse. — Raymond Bennett of Portland, Maine, has got into the thick of the war effort. His company has laid 10,000 feet of 12-inch wrought-iron submarine water pipe for supplying fortifications. A recent magazine article carried a description of the controlled buoyancy method used for the laying of most of the pipe — a method invented by Bennett.

Henry Eaton quit war work in 1943 and retired to his farm in Temple, N.H., to raise food for soldiers. He harvested 1,000 bushels of apples and quantities of vegetables. In the winter he lives in Peterboro, N.H., and a few days after the reunion, which he did not attend, he called with George Priest to see me at Westmoreland. I enjoyed their call very much. Eaton is going to help Priest with the sugaring off.

I regret to announce the serious illness of Maurice F. Richardson of Berwyn, Pa., and the death of Asa W. Grosvenor on May 10, 1943, at Santa Monica, Calif.

Some men of '99 fought in World War I and some have sons now serving in World War II: Frank F. Fowle, Jr., is a lieutenant in the Navy somewhere in the South Pacific. Harold Graves has two sons in the service: Winsor is a captain in the Medical Corps overseas; Gilbert, the younger, has been selected for officer training in the ski troop unit. Arthur Hamilton, Jr., is a captain in the Ordnance Department of the Army. Leighton R. Rickards '33 is a lieutenant in the Navy's aeronautical maintenance branch in Washington, D.C. He is working on the salvage of rejected parts of airplane engines and trying to find out why parts wear out so soon. David Congdon is with the Chemical Warfare Service, Camp Sibert, Ala.; and Waddell has a son in the Chemical Warfare Service with headquarters in New York City. He took Reserve Officers' Training Corps training when he was at Tufts because "there is going to be a war and I am going to be ready." — W. MALCOLM CORSE, *Secretary*, Westmoreland Depot, N.H. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.



## 1900

The annual dinner in February was fairly well attended by the Class. At the table were Fitch, Jackson, Patch, Richardson, Russell, Wastcoat, Ziegler, Silverman, and the Secretary. Included among the men who attended the January meeting of the Washington Society of the M.I.T. were Jones and Stratton. Price attended the alumni luncheon sponsored by the Technology Club of New York during the annual meeting of the American Society of Civil Engineers last January.

A post card from Osgood received lately shows that he is lending a hand in a modest way in the Ordnance Department at the Pentagon, Washington, D.C.

Word has come in of the death on February 11 last of Willard W. Stone at Glen Cove, Long Island. For many years he had been engaged as engineer for New York City on the huge Catskill Mountain water supply. — A delayed report has just reached us of the death on June 28, 1942, of Ralph Stevens, III, of West Brookfield, Mass.

Those of the Class included in this year's "Technology Bookshelf" are Carleton Ellis (died 1941): *Handbook of Plastics* (with H. R. Simonds); C. H. Hughes: *Handbook of Ship Calculations, Construction and Operation*; and M. C. Mott-Smith: *Course in the Fundamentals of Electricity*. — C. BURTON COTTING, Secretary, 111 Devonshire Street, Boston 9, Mass.

## 1902

The Class turned out very well for the Alumni Banquet, with Bassett, Hunter, Sherman, Moore, Taylor, Proctor, Patch, Philbrick, Sawyer, Sears, and Williams at the class table. An informal prebanquet gathering was held at Bert Sherman's office, merging in with a larger gathering of '99 in Hervey Skinner's sanctum. Moore was back in civilian attire, having been retired from the Army in October. Hunter passed the word that he was again a grandfather, Susanna Kimball having arrived on January 7. The engagement of his daughter, Elizabeth Sewall, to Robert Lane Scott was announced on February 27. Mr. Scott is a Harvard graduate and is now engaged in research work at Princeton.

The death of Allen Lansing Appleton, XIII, was reported in the Boston *Herald* of February 27, from which we quote: "He was born in this city [Springfield], the son of Julius H. and Helena S. (Allen) Appleton. He attended the public schools and Phillips Academy. . . . While at M.I.T. he studied naval architecture and following graduation taught in that department. He then came to this city, where he was employed by the Chapman Valve Manufacturing Company and the Baush Machine Tool Company. He retired to devote his time to estate management. He was a life-long devotee of yachting and maintained his own boat at Marblehead for 20 years. He was a member of the Eastern Yacht Club of Marblehead. In 1904 he married Lydia Dexter Owen of Providence, who survives him. He also leaves two sons, Atty. Julius H. Appleton and Edward A., both of this city. Another son, Owen, was killed in the civil war in Spain seven years ago." — BURTON G. PHILBRICK, Secretary, 246 Stuart Street, Boston 16, Mass.

## 1904

Your Secretary wishes to apologize for the entire lack of class notes for several issues. This is due partly to the usual scarcity of news and partly to the fact that he has been mostly out of circulation since last November; as these notes are written, at the last of March, he is gradually recovering his normal state and hopes to be in full blast by the time you read them.

Our star reporter, Charlie Locke '96, sent the following information on October 13: "Guy C. Riddell, chief of the mining projects section, office of exports, Office of Economic Warfare, and chief metallurgist for the O.E.W. Analysis, has resigned to take up mining and industrial work in this country, Asia, and South America for private clients who are interested in developing strategic industries." On January 11, he sent this supplementary item: Guy C. Riddell is consultant for the Foreign Economic Administration. He may be reached at 3822 Livingston Street, Northwest, Washington, D.C."

Since our last appearance in The Review, word has been received of the death of the following classmates: Lewis C. Clarke on November 18; George W. Sanborn on January 13; Garrit S. Cannon on November 29, 1942; and Francis T. Scannell on February 25, 1943.

In January, "General Holcombe" wrote: ". . . I still play 18 holes of golf every good Sunday and bowl once or twice a week. But I can't get Mert Emerson to exercise any more. Now that he is a Social Security judge and president of our local alumni association, he is too busy for such frivolous things. When this war is over, I hope to see you as of yore."

Our Class was well represented at the banquet on Alumni Day by 13 members, some of whom had not been seen for years. In spite of the usual feeling about the number 13 the Secretary knows of no ill luck occurring to any of the participants: Munster, Fellows, Galusha, Comstock, Ingram, Whitaker, Magnuson, Lang, Parker, Ferris, Stevens, Gene Russell, and Moore. A preprandial gathering held at the Engineers Club was attended by Munster, Fellows, Galusha, Comstock, Parker, Ferris, Stevens, Russell, and Moore. The other four might as well have been there, but their presence in Boston was unknown at the time. Needless to say, a good time was had by all.

As you know, this year marks the fortieth anniversary of the graduation of our Class, and under normal conditions, plans would now be completed for a celebration. As these notes are written, the Secretary and those upon whom he calls for assistance are frankly in a quandary as to what to attempt. The shortage of gasoline and rubber and the tightness of rail transportation are difficult factors. By the time you read these notes, however, a decision will have been reached, and ample notice will be given of what may transpire. — HENRY W. STEVENS, Secretary, 12 Garrison Street, Chestnut Hill 16, Mass. AMASA M. HOLCOMBE, Assistant Secretary, 3024 Tilden Street, Northwest, Washington, D.C.

## 1905

Some of us helped usher the Class of 2-44 (2 meaning February graduation, because

there'll be another, 10-44, in October) into the Alumni Association, said few being Babcock, Smart, Shapira, McLean, Fisher, Killion, Harvey, and your Secretary at the 1905 table, with Frank Chesterman, President of the Alumni Association at the head table. Frank sneaked down to our table just long enough to enable us to drink a Haffenreffer toast to the first 1905 President of the Alumni Association. Before the Alumni Dinner we had a "preview" in Pete Harvey's room with liberal entertainment by Pete. Gathered there besides those listed above were Harry Donald, and special guests ushered in by Andy Fisher: Alan A. Clafin, the '94 orator on the Class Day program, also Prescott '94, King '94, Worcester '97, and Lawrie Allen '07. These foreigners seemed to assimilate both the spirit and the spirits of 1905 quite readily and voted themselves associate members of the Class in appreciation. Killion lacked only a piano to whip himself into a keen spirit of conviviality.

Your Secretary had but a few hours' notice Saturday morning to round up an audience for the "preview," but in the course of his telephone calls talked with Kenway, Carhart, Gammons, George Perry, Pirie, and John Ayer, all of whom wanted their best wishes extended to "the gang out there." Incidentally we found on our table at the dinner a brochure of the Technology Club of Chicago, and right in the middle was a photo of Pete, now President of the Club.

We learn from Ros Davis that besides his executive and fiduciary duties at Wesleyan Station, he is now teaching descriptive geometry to Navy V-12. "If Free-hand Charlie could only see me," says Ros, or does he mean Linus? Walter Burns in apologizing for belatedly sending in class dues, says: "No children, hence no descendants; neither have I any news."

H. S. Bailey, manager of the Exchange Orange Products Company, Ontario, Calif., writes: "Here are a few news items out of which you can cull any that you think would interest other members of '05. Remember that I was connected with the Class for only one year, after I was graduated from Kansas State and that very few people outside of Course V ever knew me. I have recently become a grandfather, and as my Navy son-in-law was ordered East three days before his daughter was born, I had to take the part of the anxious father at the hospital. Believe me, I found it considerably more trying than at the time my own daughter was born in Washington, D.C., nearly 35 years ago. Our son, Edgar, having gotten his Ph.D. at Stanford in geology a few years ago, is engaged in the strategic minerals survey of Nevada for the United States Geological Survey. We should have liked him to become the third generation of chemists, in which event he certainly would have gone to Technology. The best we could do, however, was to have him qualify as the third generation of Sigma Xi."

"As far as the old man goes, he is approaching retirement and not liking the prospect very well, because he feels that he is a long way from the point where he should be put on the shelf. Our company's business has been more than 75 per cent with the government the past two years.

1905 Continued

We have supplied a very large proportion of all the concentrated orange juice which has gone under lend-lease to England; and similarly we have contributed what we think is a good deal more than our share of the pectin that keeps British soldiers in jams and marmalades. . . . Our business has increased from a gross sales value of products of less than a million dollars five or six years ago, to better than seven and a half million dollars last year. . . . In a later mail we got an embossed and embellished card inviting us to attend the presentation of the Achievement "A" Award to Bailey's company by the War Food Administration on March 31.

Mrs. William H. Beers reports from Gatun, Canal Zone, that her husband, Bill, VII, passed away very suddenly on January 18, but we have no details. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 71 Newbury Street, Boston 16, Mass.

## 1906

Five members of the Class besides the two Secretaries showed up at the Alumni Banquet held at the Hotel Statler, Boston, on February 26. They were Abbott, Ball, Ginsburg, Hinckley, and A. B. Sherman. We had the good fortune to be seated at a table in the balcony overlooking the head table, a position which gave us a fine view of the festivities. The banquet was up to the usual standard, and the seven of us present from the Class had a most enjoyable time. We autographed one of the menus and sent it to Cupid Nash, as a reminder of his faithful attendance on past occasions. Several members of the Class responded to the invitation to pay for a ticket for a member of the graduating class. Those of our Class who attended by proxy were E. M. Berliner, O. B. Blackwell, P. B. Stanley, P. E. Tillson, and H. E. Young. Hinckley and Sherman also each underwrote a guest ticket.

On January 30, Percy Tillson had penned the following lines to the Secretary: "I realize that I have been very remiss in keeping up class contacts. This fact was impressed on me by receipt of the Alumni Day circular. I can't be present at that time, but I shall be represented, I hope, by my younger son, Henry C. He was '45, V, and last summer, as one of the Navy V-12 group, was ordered to the Institute, where he is still carrying on. I've told him to look up the '06 gang at the dinner on the 26th and pay my respects to you all. So if a 'gob' comes around claiming to be a son of '06, please don't tell any tales on his old man. My older son was graduated from Dartmouth last December in the class of '43 and being in the reserve, was ordered into active duty. After basic training he was assigned as an engineering student to the Army Specialized Training Program unit at the University of Illinois, where he is still stationed. I've not seen or heard of any '06 men for some time, but there are in town a number of Alumni of other classes whom I see from time to time. Please give my regards to any of the old gang whom you may see." The foregoing letter was shown to classmates at the dinner, and we were all prepared to greet Henry C. We were disappointed that the young man did not appear.

The following letter was received from Harold Coes on February 8: "I learned that our classmate, Eugene P. Chase, 224 North Narberth Avenue, Narberth, Pa., died last October. His widow wrote to me a short time ago. I hadn't seen Gene for several years, though we always exchanged Christmas cards. . . . I became a grandfather on November 16. My youngest son, Harold Vinton Coes, now a lieutenant and a doctor with the amphibious forces of the Navy in the Mediterranean theatre of war, is the father. This is the first grandchild in the family. A few days before Christmas, the Army reached out for my oldest son, Kent Day Coes, and he is now at Fort Bragg, N.C., in the Field Artillery replacement center. I finished my term of office as President of the American Society of Mechanical Engineers in December. It was an inspiring and interesting experience, but one year is enough. When some of the group get together at the alumni meeting the latter part of February, please extend my regards and best wishes." This letter was circulated among those attending the dinner. Classmates will be interested to learn that further honors have come to Harold in the business world, as the New York Times of February 19 stated that he had been elected a director of Ford, Bacon and Davis, Inc., in addition to serving as vice-president of that engineering organization.

The Boston Herald of March 16, under the heading, "New Citizens," included the following item: "To Mr. Neil J. Dushan, USCG, and Mrs. Dushan of Cambridge, a daughter, Karen Lee Dushan, March 8, at Wyman House, Cambridge. Grandparents are Mr. and Mrs. Henry A. Ginsburg of Cambridge and Dr. and Mrs. Sidney Dushan of Mattapan." This puts Henry in the grandfather class.

The following letter from Sherman Chase explains his absence from the Alumni Dinner: "I was sorry not to attend the Alumni Dinner, but I was in Los Angeles at the time working on an investigation of the sewage disposal problem of the city. While in Los Angeles, I gave a little talk before a group of members of the American Society of Civil Engineers, and at this meeting ran into George Davenport, I, who is an engineer with the Santa Fé railway in Los Angeles. We had not seen each other for 30-odd years. I am sending you, under separate cover, a brochure entitled 'Blueprint Now,' prepared by a committee of which I am a member. You may be interested in this pamphlet, as I think it is rather well gotten up." The Secretary was relieved to receive this letter, as Sherman has an excellent record for attendance at the annual dinners. The brochure referred to in the letter is devoted to the importance of including water and sewage works in post-war plans. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver Street, Boston 10, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

## 1907

Only five '07 men attended the Alumni Banquet on February 26 — Lawrie Allen, Clinton Barker, George Crane, Ralph Hudson, and Ed Lee. Transportation difficulties kept away several who otherwise would have been there. — Frank E. Hamilton has

moved from Scarsdale, N.Y., and has his address at the University Club, Milwaukee 2, Wis.

Otto A. Johnson, who was associated with our Class for a short period in Course IV and had lived in Greenfield, Mass., died on March 8. — A note received from Frank MacGregor under date of February 29 says, in part: "You may be interested to learn that a few weeks ago I was in New York attending a chemical industry meeting, and among several Army officers whom I met was a Major Keeling. As I looked at him, I thought of Tom Keeling '07, although I have not seen him since 1907. I asked the major whether by any chance his father were Tom Keeling, and he said that he was Tom's son and also a Tech man, Class of '35."

All three sons and one son-in-law of your Secretary are now in the armed forces. The oldest son, 33, the father of a nine-year-old girl, is in the infantry; another son, 27, single, is a bombardier in the Army Air Forces; the youngest son, 25, the father of a one-year-old boy, is in the transportation division of the Army. The son-in-law, husband of our younger daughter, is in the Navy. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

The Class was well represented on Alumni Day at the Stein-on-the-Table Banquet at the Hotel Statler on February 26. Previous to the dinner there was an informal roundup for cocktails at the University Club, and then on to the banquet. The following attended: Ted Joy, Toot Ellis, Bill McAuliffe, Linc Mayo, Cookie, Joe Wattles, George Belcher, Harold Gurney, Sam Gardner, Nick Carter, and Henry Sewell. As every member of both senior classes had been invited, the total attendance exceeded all previous records.

The third class meeting and dinner of the 1943-1944 season was held at the University Club, Boston, on March 14. The following were present: Lang Coffin, Bill Booth, Sam Hatch, Steve Lyon, Henry Sewell, Harold Gurney, Myron Davis, Cookie, Linc Soule, Joe Wattles, George Belcher, Linc Mayo, and Nick Carter. After an excellent dinner Joe Wattles showed a very interesting British sound movie dealing with food problems.

With further reference to Harold Gurney's one-man team to increase our class funds, as mentioned in the March issue of The Review, the following letters from George Glover will be of interest — the first, to Harold: "Many thanks for the copy of your letter to Jimmy Burch. You have put me on the spot somewhat, so I am following Jimmy's example. I think you have put yourself on the spot, because Jimmy did get a nice enlargement of the group picture. I liked your story very much and am passing it on." The second was to Linc: "I just received a copy of Harold P. Gurney's letter to Jimmy Burch, and enclosed is my check for \$10. According to Harold, some of the stories that are told at the bimonthly '08 dinners are somewhat risqué, and I trust that the boys will be more careful in the future. I have not lost



my enthusiasm about a little New York gathering this spring and hope it can be arranged."

We are sorry to report the death in California of Leavitt W. Thurlow and also the death of Abbot Thompson's son Whittier on March 3 in the South Pacific area. — We have the following changes in address: G. William Bailey, 896 Ridgewood Road, Millburn, N.J.; Herbert A. Cole, Jr., New England Telephone and Telegraph Company, 50 Oliver Street, Boston, Mass.; Major Lynn A. Loomis, Camp Sibert, Ala.; Matthew Porosky, LeClaire Hotel, Moline, Ill.

A very interesting article on renegotiation by Colonel Willard F. Rockwell, chairman of the board, Timken-Detroit Axle Company, was carried in a recent issue of the *Washington News Digest*. It was entitled, "Political Persecution." — The *General Radio Experimenter* for November contained an article by Gregory M. Dexter on "Resonant Vibration in Large Engine Foundation."

Karl Kennison and his son Hugh '39 attended the alumni luncheon held during the annual meeting of the American Society of Civil Engineers in New York City on January 20. — Your Secretary had an opportunity recently, when in New York, to call on Ted Barnes, chief engineer of the Borden Company, and told him we were trying to get '08 men in the vicinity of New York City together for a dinner sometime this summer. Ted said he thought it a fine idea and would be glad to talk it up. — The fourth and last dinner meeting of the winter season will be held at the University Club, Boston, on Tuesday, May 16, at 6:00 P.M. Joe Wattles has promised to show Kodachromes taken during a visit to Florida, as well as some skiing pictures for contrast. The usual notices will be mailed early this month. Please make your plans to be with us. — H. LESTON CARTER, Secretary, 60 Battery March, Boston 10, Mass.

## 1909

There were 15 of us at the Alumni Banquet held at the Statler in Boston on Saturday evening, February 26. The roster is as follows: George Bowers, I, Chet Dawes, VI, Tom Desmond, I, Delos Haynes, VI, George Haynes, VII, Austin Henderson, I, Mayo Hersey, II, Francis Loud, VI, Lou Nisbet, I, Ben Pepper, I, F. Gardiner Perry, VI, Art Shaw, I, Chick Shaw, V, Henry Spencer, II, and Johnny Willard, II. We were assigned two tables on the upper starboard deck. Needless to say, old days and the whereabouts and doings of classmates were widely discussed.

George Bowers is still with the Federal Housing Project in Lowell. Tom continues to work with Governor Tom to give the Empire State an A-1 government. While here in Boston, Tom spent some time at the Arnold Arboretum studying shrubs and other flora, one of his hobbies. The following Monday he attended the M.I.T. Corporation meeting. Delos Haynes, patent attorney in St. Louis, has several clients in Greater Boston and spends about half of each month here; George Haynes still devotes about half of his time to advertising. Austin Henderson is with the Crandall Dry Dock Engineers, Cambridge, and his work is concerned with marine railways and floating docks. Mayo Hersey, a recog-

nized authority on bearings and lubrication, is engaged in war work at the Institute. Francis Loud is with Jackson and Moreland, his work being mostly appraising. Lou Nisbet has severed his connections with the War Production Board in Portland, Maine, and is now on his own. Ben Pepper, who has always been in the insurance business, reports that his son Ed is a lieutenant, junior grade, on the *Hammann*, a destroyer escort doing active duty in foreign waters; John, the other son, is a Navy V-12 student who has taken Navy training courses at Holy Cross and is now at Tufts en route to a commission.

Fred Perry is now executive secretary of the General Convention of New Jerusalem (church) with headquarters at 12 Huntington Avenue. He has severed connections with Babson's Statistical Organization except that he continues as president of A.P.W. Properties (real estate) at Albany, N.Y., a Babson subsidiary. Art Shaw is still a partner with Metcalf and Eddy, engineers, and Chick Shaw is still with the Avon Sole Company, building Duflex soles with synthetic rubber. Henry Spencer, treasurer and manager of the Blanchard Machine Company, makers of surface grinders, reports that the company has just received the third Army-Navy "E" award, which entitles it to two stars on its flag. Johnny Willard, who is still vying with Eleanor for traveling supremacy honors, commutes to and fro from the Atlantic to the Pacific and then to the South. He and Harry Whitaker, VI, are expert consultants for an advisory committee of the Chief of Army Engineers, and it is reported that they are doing real things for the Army.

The all-important topic of discussion, however, was the subject of a 35th reunion, several being dissatisfied with the proposed omission of it. Carl and Paul jointly submit the following: "This, of course, is the year for our 35th reunion. Months ago a reservation was made at Oyster Harbors. We hoped that by June, conditions brought on by the war would make possible a reunion such as we have so much enjoyed down on the Cape. But at this writing, late in March, travel and everything about the reunion have made us reluctantly decide to put off any pretentious affair for the duration. Next year, perhaps, we can have another of our large get-togethers. But the officers of the Class want you to feel that they came to this conclusion only after the most careful consideration and study, and deeply regret that we cannot have the regular five-year reunion as we had planned."

A canvass of those at the Alumni Banquet showed, nevertheless, that nearly all present advocated a reunion of some kind and stated that they would attend if one were held. It was felt that a readily accessible resort somewhere between Boston and New York should be selected. On being advised of this sentiment, Carl and Paul both have assented to our going on our own without the official sanction of the class officers. Hence the Review Secretary immediately made inquiries and has found that the Hotel Griswold at Groton is available and that Riversea Inn at Old Saybrook, where the 1921 outing was held, may or may not be open early enough. It may be decided to determine the number who would be interested in such a reunion and to hold

it in a quiet sort of way. There would be no pressure for a large attendance, but the opportunity to meet together would be offered to those who could come without hindrance to the war effort. The Review Secretary would welcome opinions on this somewhat vexatious question.

The Army has announced the streamlining of the defenses along the Atlantic Coast by amalgamation of four sector headquarters into two sector headquarters, the northeastern and the southeastern sectors. The northeastern sector is to be commanded by Kenneth T. Blood, II, as major general of coast artillery. Ken formerly commanded the New England sector. The Class certainly congratulates him on his promotion to increased responsibilities. — Maurice R. Scharff has been promoted to full colonel, Corps of Engineers. Congratulations, Molly! Scharff, Ed Merrill, and John Nickerson from our Class attended the March 9 meeting of the Washington Society of the M.I.T. at which Bradley Dewey spoke, and Scharff draws our attention to Colonel Dewey's position on the newly stringent policy toward draft deferments for men under 26, as it may threaten the success of his synthetic rubber program. At a recent press conference, Dewey stated: "Some means must be found to insure that no further induction of essential chemists, engineers and skilled operators brings about the unnecessary failure of the rubber program, which is so tight that any slow-up might spell national disaster . . . irreplaceable men are being lost."

Dave Marvin, XIII, a lieutenant-commander in the United States Coast Guard, retired, writes as follows: "I was retired from the Coast Guard in 1921 but was recalled in 1927 and 1942 — for seven years the first time, and to date this time. I envy you your cruising on the coast of Maine; I was stationed at Portland in the old *Androscoggin* in 1912, when I was first commissioned, and we used to drop in at Boothbay Harbor summer and winter in the two years I served on that station. We had many good times there. But for year-round comfort when you are getting no younger, I prefer San Diego, where three years ago I built a cozy little cottage on the beach, to which I hope to go back when this mess allows. Of course I have seen Ellis' book *Coast Guard Law Enforcement*, but I do office work these days; when I was a boarding officer, checking up on schooners, I'd have liked that book. It is generally used. My own little book, *Coast Guard Version of Chapters 1-5 of the 1943 Bluejackets' Manual*, has been much used by the Coast Guard, printing some 43,000 copies. . . . The pictures were made under my supervision. The Navy Manual has little mention of the Coast Guard that has helped in all the wars, so I wrote this for our men."

With regret we report the death of Henry T. Gidley, I, which occurred at Fairhaven, Mass., on March 3. Art Shaw, who knew Henry personally and is familiar with his work, writes as follows: "Henry died suddenly of a heart attack while attending the funeral of a friend. He was a descendant of early settlers in Dartmouth, Mass., receiving his early education at the Dartmouth public schools, the Friends' school at Westtown, Pa., and M.I.T. For a few years after graduation, he was employed on sev-

1909 Continued

eral civil engineering projects and had entire charge of laying out the Perkins Institute for the Blind at Watertown. For the past 31 years he had been superintendent of the Fairhaven Water Company and at the time of his death was treasurer. He was active in the New England Water Works Association. He was also highly interested in civic affairs, being a town meeting member and former president of the Fairhaven Association of Business Men and the Fairhaven Improvement Association; he was interested in the Fairhaven Boys Club, was a director of the Salvation Army, and a member of the Dartmouth Monthly Meeting of Friends. He was 65 years old and is survived by his widow, Mrs. Gertrude (Gibbs) Gidley; a son Philip T.; and two daughters, Mrs. Donald Burton and Charlotte Gidley. — PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

## 1910

It is with extreme sadness that your Secretary has to report the passing of Charlie Greene on March 8, after failing health for over a year. He had spent the month of February in Florida with the hope that his health would improve, but one week after he returned he passed away very suddenly. We shall all miss Charlie; he was a loyal 1910 man and had served as class representative on the Alumni Council for the past 30 years. O. J. Crommett, Albert Huckins, Carl Sittinger, and your Secretary attended the funeral services.

The Alumni Banquet held at the Statler Hotel in February was attended by the following classmates: Jack Babcock, Dud Clapp, Bob Burnett, Charles Wallour, and your Secretary. — Carl Lovejoy, who is a major stationed at the United States Engineer Office in Providence, frequently visits the Division Engineer's Office where your Secretary is located.

The following item was taken from the Philadelphia Record of January 29: "Appointment of Karl D. Fernstrom as vice president in charge of production, a newly created post, was announced yesterday by the Cramp Shipbuilding Company. Fernstrom assumes his new responsibility with a background of both academic and practical shipbuilding experience. . . . He was associated with the Newport News Shipbuilding Company during the first World War. Later he returned to M.I.T. as an instructor in economics and at the same time served as consultant to the shipbuilding industry. In 1941 he became vice president of the North Carolina Shipbuilding Company, a new organization which under his supervision produced Liberty ships at the rate of one every three and one-half days. More recently he assisted William Jeffers in solving synthetic rubber distribution problems and, at the request of the Maritime Commission, served as chief operating officer of the Harrisburg Machinery Company and the Springfield Foundry Company, . . . completing contracts for Liberty engines." — HERBERT S. CLEVERDON, Secretary, 117 Grant Avenue, Newton Center 59, Mass.

## 1911

Right now I want to express to you 148 loyal 1911 men my deep appreciation of your response to the appeals of Alumni Fund IV, just closed, and to bespeak your continued support of Alumni Fund V — with the further fervent hope that we'll have even more classmates on the band wagon in this current 1944-1945 Fund year. Think of it, your contributions gave us 116 per cent both of our financial quota and our quota of subscribers, putting 1911, with \$3,414, out front in the amount raised by any Class, and second only to the Class of 1891 in exceeding our quota of subscribers. A grand record!

We missed by only one having eleven '11 men at the Alumni Banquet at the Statler in Boston on February 26. Your Secretary was, as usual, song- and cheerleader and with him at the 1911 table were Bill Couburn, I, Art Coupal, II, George Cummings, VI, Tom Haines, II, F. C. Harrington, I, Jack Herlihy, II, Roger Loud, VI, Morris Omansky, V, and O. W. Stewart, I. That, you see, put Courses I, II, and VI in a three-way tie, with three representatives each, with one chemist for good measure.

Two weeks later at a monthly dinner of the Technology group in Washington, D.C., according to a note from Colonel Carl G. Richmond, I, "with no prearrangement six 1911 men were sitting together." Carl thoughtfully headed a card, "Regards to Dennie, whenever six eat together," and the signees were Dave Allen, II, Ned Hall, II, Phil Kerr, II, Ted van Tassel, X, Aleck Yereance, I, and Carl himself. Carl added that Van Tassel, a major in the Chemical Warfare Service, was visiting the capital from Huntsville Arsenal, Huntsville, Ala., the others being "at home." Such thoughts delight the heart of a Class Secretary.

Speaking of secretarial delight, I had a grand letter recently from Franklin Osborn, III, from South America (taking only three weeks in transit). He has been there for years with the Andes Copper Mining Company, Potrerillos, Chile, Via Chanaral. He says that they are about three months behind on steamer mail — magazines and so on — but that the plant has been on a 24-hour schedule at full capacity since the end of 1940. Frank has been a regular subscriber to the Alumni Fund and enclosed his subscription for the new Fund about to start.

"My oldest boy," he writes, "a first-class petty officer on the cruiser *Chicago* (at the age of 18) was on board when it was sunk and later on a battle wagon; after recovery from some scratches, he was scratched up again and invalided back to the States in April, 1943, to a San Diego hospital. He arrived at our South Jersey home in May, 1943, to convalesce and went back into active duty on the cruiser *Tuscaloosa* that July. (He will be 20 this May.) He was in Sicily and Italy (Salerno and Naples, I believe), and then went with a task force to the Norwegian Coast. In between these scraps he was on the task force to Spitsbergen and on one convoy to Murmansk. I think his ship got scratched up in the English Channel in late November, was recently overhauled, and was away again in early February. So he has seen plenty.

"My second boy graduates from Vineland (N.J.) High School this coming June.

He has been in the Naval Reserve since last December and is wing leader of all possible V-5 naval aviation cadets at the school. As such he recruits the boys. On being graduated (at 17 years 9 months), he will go into training and later, when he passes all the ropes, will come out as an ensign in the Navy or second lieutenant in the Marine Corps. He has been president of the high school student council this past year and though born down this way, had a name which one could pronounce. Some of his fellow members on the council have tongue-twisting names.

"Different political situations produced in Argentina, Bolivia, and to a lesser extent here in Chile are fast clearing up. Chile has really cleaned house in the past year. I believe our State Department is getting better men down here. They need men who know the people and who speak the language. . . .

In Gardner, Mass., I recently had a nice renewal of acquaintance with Stan Harts-horn, and found that his daughter, Barbara, is now a lieutenant, junior grade, in the WAVES. His son, about to be graduated from high school, hopes to enter either Technology or the Tuck School at Dartmouth. I also learned, from Don Stevens, that Donald R. Stevens, Jr., '43 is an ensign with the Seabees and was on Tarawa the last he knew. He added that much to the delight of Mrs. Stevens and himself, C. R. Johnson, X, and his wife and daughter have just moved to Ridgewood, N.J., in their neighborhood.

I had a nice note from Jim Duffy, VI, business counsel, 38 South Dearborn Street, Chicago (no charge, Jim), saying: "March 15 was only three days ago, so I am not yet fully recovered from my annual 'intoxication.' One of my concerns is making ship models for Monk deFlorez' division, but Monk has so many toys and gadgets under his wing that the boats mean no more to him than another doll would to Gloria Vanderbilt."

Remember, please, I'm still anxious to have news concerning 1911 juniors in the service. Please "write to Dennie" if and when you have any such information. — One address change to close: Osborne H. Shenstone, I, 814 Ruddiman Avenue, North Muskegon, Mich. — ORVILLE B. DENISON, Secretary, 82 Elm Street, Worcester 2, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford 55, Mass.

## 1912

We are pleased to hear that John S. Grant has been made a full commander. He is now located at the Puget Sound Navy Yard, Bremerton, Wash. — Francis R. Fuller, an Army colonel, who has been stationed at the University of Maine, is now at the Army Ground Forces headquarters, Army War College, Washington, D.C.

Carl W. Somers writes an extremely interesting letter regarding the work that he is now on with Moran, Proctor, Freeman and Mueser at Elkton, Md. The project is to prevent the sinks which occur in that region when the soil becomes saturated with water and flows through crevices into subterranean caverns. The remedy is to test-drill the soil, and after having determined the location of the fault, to plug this with concrete. This looks like a large order.



## 1912 Continued

W. Graham Cole, long an outstanding leader in accident-prevention work and for 19 years head of the Metropolitan Life safety service, has been appointed an assistant secretary of the company. Cole is a member of the board of directors of the Institute of Traffic Engineers; general chairman of the street and highway traffic section of the National Safety Council; member of the operating committee and chairman of the wartime off-the-job accident prevention committee of the Greater New York Safety Council; a member of several national, state, and local traffic and safety committees. — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown 72, Mass.

## 1914

As this is the last issue of The Review you will receive before the reunion, perhaps it will serve as a final reminder that the dates are May 26 to 28, and the place the Westchester Country Club, Rye, N.Y. If you are planning to attend and have not yet sent in your reservation, please do so at once.

The big event in recent months was the Alumni Day Dinner at Boston on February 26. We had our customary preprandial meeting which was unusually pleasant, being graced by Porter Adams. This is the first time since our 25th reunion at Swampscott that he has been able to attend a class gathering. Most of these five years have been spent in bed. Although still using crutches, Porter is now able to get around again, and his health is better than it has been for many years.

Eighteen members of the Class attended: Adams, Atwood, Crocker, Derry, DesGranges, Fales, Gazarian, Hadley, Hamilton, Hanson, Mackenzie, Petts, Richmond, Trufant, L. A. Wilson, Scannell, H. S. Wilkins, and our honorary member, William Jackson. Al Hanson made the trip up from Washington; and Louis Wilson, from Palmerton, Pa. Dana Mayo had made a reservation, but unfortunately he had to go to Detroit instead. Much enthusiasm was expressed for the May reunion. Eighteen classmates, but not the identical list of those attending the dinner, were listed as hosts at the dinner to this year's senior class. This pleasant custom of inviting the senior class to attend the Alumni Day Dinner is doing much to bring the students and the Alumni closer together.

Arthur Petts has rejoined the Ellis Tool and Die Company at Chelsea, Mass. — Tom Richey, a rear admiral in the Navy, has been transferred from the Norfolk, Va., Navy Yard and is now on duty in Washington in the office of the commander in chief. — Harold G. Storke, an Army colonel, received considerable publicity in the press the other morning on his assignment as commander of a prison camp at Camp Devens, Mass., to handle a large number of German prisoners of war. These men will be sent out in groups to help relieve the paper-pulp shortage in northern New England.

Our rubber authority, Ray Dinsmore, Vice-president in charge of research and development of the Goodyear Tire and Rubber Company, also made press headlines recently. The occasion was an address before the Akron-Canton-Cleveland section

of the Society of Automotive Engineers. Ray told about the basic rubber situation and the place of synthetics, and warned that the difficulties in the manufacture and uses of synthetic rubber were not yet over.

On March 23 the Campbell Soup Company received the Achievement "A" Award from the War Food Administration. Buck Dorrance, President of the company, received the award on behalf of the company and its employees. Not previously mentioned in these notes is the fact that Buck was elected a director of the Pennsylvania Railroad a year ago. He had already been a director of three subsidiary units for several years, as well as of one of the American Telephone and Telegraph Company units and several other nationally known institutions.

Leicester Hamilton, Acting Head of the Chemistry Department at the Institute, became a grandfather for the third time on March 16. — A recent article in the Boston Herald was devoted to the Veteran Motor Car Club of America. Dean Fales and Jonnie Leathers were among the list of old-timers receiving special comment.

Your Secretary recently completed a quick sweep around the country but unfortunately did not have the opportunity of looking in on any '14 men. Covering 10,000 miles in two weeks did not leave much idle time, particularly as most nights were spent on Army reservations. He did, however, see Don Douglas' son, Don, Jr., who is in charge of field testing for one of the Douglas units. Young Don is a perfect image of his father. The visit to the Douglas plant at Santa Monica was one of the high spots of the trip. The expansion in the past five years since your Secretary was last there is truly staggering. — H. B. RICHMOND, Secretary, General Radio Company, 30 State Street, Cambridge 39, Mass. CHARLES P. FISKE, Assistant Secretary, 1775 Broadway, New York 19, N.Y.

## 1915

With the opening of this year's Alumni Fund, I hope that the Fund will take a regularly established annual place in your hearts and your minds. If you 150 classmates who gave so generously last year will give again equally as generously — more so if possible — this year, we shall go over the top on our quota. I have a new appeal to you: Make my job as class agent easy by sending in your check now, promptly!

Read these interesting letters — some from classmates from whom we haven't heard in a long time, others about our recent Boston and New York class dinners — all good! Loring Hall, Detroit: "Charles Loring, III, arrived safely on November 5, and that he'll be entered in the Class of 1965. He has the head of a mathematician and the eye of a man of good judgment. . . . By this time next year we shall be giving some thought to our 30th. Think of it!"

Fred Vogel, Oak Park, Ill.: "I've been sort of a stranger since it seems that I don't hear from a classmate once in a year. Once in a while I see Phil Alger, and last year saw DeBeech of the Canadian and General Finance Company, when I was still in Sharon, Pa. I recognize your job as class secretary as a necessary one and am glad to co-operate by contributing my bit this

year." — Greville Haslam, Philadelphia: "I have your fascinating invitation for the 18th, but I just can't make it. We have the annual meeting of our Headmasters' Association of the United States coming up and this infamous crowd of men two years ago elected me secretary, and for my sins I am busier than an armless man with a slide rule. . . . Your invitation, however, will result in my drinking a toast to the crowd *in absentia* and probably after several I'll think myself a descendant of John Harvard, although the only thing that Rooney has on me to support his prior claim is his crimson hair. . . . The Philadelphia crowd is fairly active, and I imagine that either Whiting or Anderson will be with you. I envy them the privilege. . . ."

Doug Baker, Summit, N.J.: "Your noteworthy appeal for class funds is difficult to resist." — Ken Boynton, Mexico City: "I wish I could write you something of interest, but no such luck. Our reunion of 1940 seems a long way back, so much has happened in the meantime. . . . Here's my check for class dues." — Kebe Toabe, Elizabeth, N.J.: "Both my sons were in the service; the older son is now medically discharged from the Army, the younger is in the Marine Corps V-12 at school at the University of Michigan. He is anxious to get into action and expects to be transferred to either Quantico, Va., or the Marine training camp in California. Mrs. Toabe wishes to be remembered to you."

Larry Landers, Boston: "Your heart-rending, most touching letter of appeal was received, and I hasten to come to your rescue. I am very appreciative of the hardships of a Class Secretary but prefer not to state my opinion in writing as to the category in which I should place you (Henry Sheils and I have our own opinion on this subject) but would be glad to voice my sentiments on your secretarial capacity when I see you. . . . Shall make an effort to attend the class reunion and needless to state I am most anxious to be there, for it is imperative at this stage of the game that we fellows of '15 keep in touch with one another. . . . Decent of you to keep the tariff down to \$2.75, but that probably gives you a net profit of \$1.50 — knowing you as I do. Is the perfume tax included in that \$2.75?" — Charles P. Washburn, Middleboro, Mass.: "Yes, sir, I can spare a check for class dues, but I was there for a brief term only. I had some sons there before the war, so guess I still belong."

Vincent Maconi, New Haven, Conn.: "Your letter convinced me that my turn had come to give some news of myself to classmates. I have always enjoyed reading the news of the others, and here is my response. . . . My son Richard was graduated from Course II on February 28 and immediately joined the Navy. He has been captain of the varsity fencing squad. . . . My other son, Norman, will be graduated from Peddie School in June and enter college in July. He is manager of the varsity swimming team and a member of the varsity squad. . . . Daughter Lois is in high school preparing for Wellesley. . . . Mrs. Maconi and I celebrate our silver anniversary on the 27th of September. If the war is over by that time, we shall make a real event of it. . . . I am very busy nowadays. I am president of the Kiwanis Club of New

1915 Continued

Haven which has a membership of about 200, also general chairman of the city development section of the New Haven post-war council. And I still find time to run my construction business with all its ramifications. . . . My wife has undertaken so many jobs that I couldn't begin to enumerate them." — Orton Camp, Waterbury, Conn.: "Are you planning a big reunion to celebrate the end of the war? I am extremely busy these days but can't complain."

Ted Friebe, Red Bank, N.J.: "I'm glad you rapped on my door, and now I know 'who gets the money for class dues.' I was in the Naval Research Laboratory in Washington for about a year. . . . After Pearl Harbor, I was recalled (as civilian) by the Navy Department to represent the Bureau of Ships in a joint Army-Navy standardization program for the component parts of radio equipment and detection instruments. Our organization is the Army-Navy electronics standards agency, and for some strange and wonderful reason it is located in Red Bank. This is probably to confuse the enemy. . . ."

Ralph Tiffany, Winsted, Conn.: "I should be very much interested to hear what the rest of the gang are doing. Do you have any register that gives the address of my old roommate, W. Mack Angus? The last I heard he was a commander in the Navy. . . . All I'm doing or have been doing for the last two or three years is trying to understand the various alphabet regulations so that I could get out lumber products on very essential war requirements."

String Hill, Hartford, Conn.: "If I were to express here my thoughts about your preferred list of customers, those remarks wouldn't be fit for print. I'm astonished that there are enough easy marks besides me to warrant your making up a special list. Anyway, I'm still easy, so here's my check. After all, we do want to 'help Azel.' Certainly your postscript is intended for those who are living dangerously and more sacrificially than I. I can only brag about my inertia which brought me a write-up in the local paper for not having changed my mind in 25 years. Three children have grown up and flown. The oldest is a lieutenant in the Naval Reserve; the next is a war-plant worker; and the third is bringing up twins. I'm still putting my best foot forward, but my right knee is giving out." — Jerry Coldwell, New York City: "This class dues appeal gets worse each year! Best of luck to you, however, and here's my check." With this classic remark Jerry, now a Vice-president of Ford, Bacon and Davis, Inc. sent me an announcement of the celebration of the firm's 50th anniversary on March 12. — Thayer MacBride, Hingham, Mass.: "Once in a while I take the class roster and read it through, wondering what many of the boys are doing and where they are. Only the other night, after reading about the repatriates returning on the *Gripsholm*, I wondered particularly regarding Harvey Daniels. Do you know whether or not he got out of Japan?"

Norman Doane, Charlotte, N.C.: "Enclosed you will find my check for biennial dues along with my congratulations to you for the fine job you have been doing these many years as class secretary. . . . I shall soon complete my first 20 years with the

Permutit Company of New York, the last 12 years of which have been in the Carolinas with headquarters in Charlotte. I have just returned from a business trip to New York City, but did not find time to look up any members of the Class, although I had a list in my vest pocket. . . . I saw Ed Proctor, President of Proctor Chemical Company, recently in Salisbury, and he seems to be doing a good business supplying special chemicals to the textile trade in this area. . . . I should like to see or hear from any of the Class who happen to be in Charlotte on war business or otherwise. . . . We entertained Frank Scully, Jr., at our home recently. He looks and acts like a chip off the old block, which is sufficient recommendation for anyone who knows his dad. . . . Oh, yes, sign me up for the 30th reunion. I will try not to let business keep me from attending this time."

Jim McIntyre, a colonel in the fiscal division of the Ordnance Department, 568 Pentagon Building, Washington, D.C.: "Still here in the Pentagon Building and have no claim to fame except that I can find my way in and out without a guide or resort to blazing a trail." — Senator Speed Swift, New London and Concord, N.H.: "I am expecting to attend the Council meeting on Monday to hear my good friend, Brad Dewey, expound on the rubber situation. . . . I can't seem to get permission from the good wife to make a second trip to Boston in the same week, so shall have to forego the pleasures of the 1915 get-together at the 'Haaarrrrrrvaarrd' Club. My regards to the gang, and hope you have another soon that I can attend."

Bill Campbell, Berlin, N.H.: "Sorry that I can't go to the class dinner, as I now plan to be in Rochester on that date. We are hard at work here getting out production under some difficulties, since, as you know paper is tighter than steel at the present time. But in addition to a few of these production difficulties, we are also in the midst of our postwar plans, rebuilding our plants to meet the competition which will arise after the war is over. . . . You may ask George Rooney to drink an extra glass of Harvard beer for me, since, being a Yale man, I might strangle on it myself. I am only sorry that I can't be present at what looks like a fine party." — Harry Murphy, North Quincy, Mass.: "Enclosed are my class dues to help keep 1915 solvent. Better that you get it now, because I may not have a dime the next time you need some — what with the democrats and all!" — Dave Hughes, Hollywood, Calif.: "Your appeal for funds was not quite so heart-rending as usual." And to prove his point Dave sent a check for \$4.99! — Boots Malone, Stamford, Conn., writes that his business there is slowing down.

Bill Stephenson, New York City, has always supported the class dues and Alumni Fund generously. Either his memory has slipped or he wants to do it all over again with this letter: "In reference to your letter dated January 10, concerning class dues, I should appreciate it very much if you would, as Al Smith would say, turn to the records and inform me how much I owe you to get square with the world. My personal regards to all."

While on Martha's Vineyard recently, I talked with Charlie Norton, who now has

a herd of 500 sheep, which he fed this winter on his first full crop of native-grown soybeans. This represents a departure in sheep feeding, but Charlie, on his modernly equipped sheep ranch, has successfully developed it in a scientific way.

Apr<sup>os</sup> of the recent Boston dinner, Carl Wood wrote that he was glad Old Rip Van Winkle Mack had come to life again. Frank Herlihy says: "I am sore that you didn't include me as one of the reasons for having the dinner at the Harvard Club, or perhaps you didn't know that I hold a master's degree at Harvard. Us boys will welcome you to *our* club." — Bert Adams: "I didn't know John Harvard was an Indian." To explain the above cryptic references I must tell you that on the notices which Henry Sheils composed, some of the reasons given for holding the dinner at the Harvard Club were that Louie Young had a Harvard accent and George Rooney was a direct descendant of John Harvard.

Last month I forgot to mention that Ben Neal had planned to come from Lockport, N.Y. to the Boston Alumni Dinner and also to see his newly born grandson, but was prevented at the last minute by Mrs. Neal's serious illness. — Another member of the Grandfathers' Club is Sam Eisenberg, Boston: "On February 16 I became a 'grand-pappy.' My daughter gave birth to a baby son. Her husband Ralph Elliot Peters, a lieutenant in the Naval Reserve, has been in the Central Pacific combat area since last July and probably won't get to meet his new son for a year or two. I hope to see you sometime soon when we may keep that belated lunch appointment."

The response to the class dues has been magnificent. I'll give you a detailed report next month. Many thanks to you all!

Charlie Williams' first letter came before the New York class dinner; the other one, after it. I think the second letter is a fitting close to this month's column, as representative of the fine spirit, loyalty, and friendship among our classmates, of whom Charlie Williams is representative: "It was good to hear from you, if only a note of appeal. I must give you credit for collecting money and making us feel good while you are doing it. I manage to keep busy with my regular job and some defense activities. I see Hank Marion and Gene Place occasionally and Harold Warfield once in a while. Also Cowles, the big city planner and waterworks man. So far I haven't heard from, or seen, anyone else from 1915 in a long time. . . . I am sorry I left the party the other evening without saying good-bye and telling you what a swell job you had done in promoting the party. I am sure that everyone had a fine time. I know I did, and I think it was swell of you to make the arrangements and of Ralph Hart to donate his apartment for the evening. I have written him to that effect. . . . I was sorry to leave while the party was still going strong, but there is little or no taxi service up my way, and if I had missed the last bus I should have had to walk two miles or so, which I was in no mood to do. . . . Please give my best to Hen Sheils and Louie Young and everybody else who came down, and my best wishes to George Rooney for a speedy recovery. . . . It was a darn good party."—AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.



## 1916

Early in March, Dave Patten wrote to say that he was off to the Southwest Pacific, assigned to General MacArthur's staff. I hope that many classmates will find time to write Dave a letter. He has an A.P.O. address out of San Francisco.

Wes Blank writes from Washington, D.C., where he is connected with the Petroleum Administration for War: "During 1941 I acted as structural engineer for E. B. Badger and Sons Company, contractors for the construction of the Plum Brook Ordnance works at Sandusky, Ohio. In 1942 I was resident structural engineer on the West Virginia Ordnance works at Point Pleasant, W. Va., with offices at Huntington. I had charge of design of all buildings and structures of any type, of railroad layout and trestles, and of the preparation of specifications for the purchase of building materials and all maintenance equipment and machinery.

"In 1943 I became associated with the Petroleum Administration for War, in the construction division, as principal building-materials allocator. Our purpose is to supervise and expedite the construction of the 100-octane aviation gasoline plants required for the prosecution of the war, and this program includes not only domestic refineries but lend-lease projects as well. A rough estimate would bring the total value of these plants to over a half billion dollars.

"I now have a son in the Army, as an Air Forces cadet, who hopes to win his wings at the completion of his course in September; I also have a daughter who is a sophomore in one of the Washington high schools. We have definitely left Massachusetts and established a new home in Chevy Chase, Md. This brings me up to date. If ever you are down this way, telephone me at Republic 1820, extension 2932." — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Berke Moore Company, Inc., 11 Boylston Street, Brookline 46, Mass.

## 1917

As these notes are written, an announcement has arrived of a series of 1917 luncheons to be held at the Technology Club of New York. The gatherings are scheduled for the third Wednesday of each month at noon. All members of the Class are urged to attend if they are in New York on these days.

Lewis Douglas has resigned as deputy administrator of the War Shipping Administration, effective April 1. Douglas will continue until about July 1, however, as Admiral Land's deputy on the combined shipping adjustment board and as chairman of the board's employment and policy committee.

At the Alumni Dinner in Boston on February 26 the following were present: Beadle, Beaver, Ken Bell, Bernard, Blanchard, Penn Brooks, Childs, Cochrane, Dickson, Gartner, Gilmour, Gurney, Hyde, Hulburd, Lobdell, Lunn, McNeill, Sherry O'Brien, Rausch, Rockett, Strout, and Jack Wood — a goodly gathering for these times. Jack Wood, as a lieutenant in the Coast Guard Reserve, was the only representative of the

services. He is teaching at the Coast Guard Academy in New London and fears that he is stuck there for the duration.

Stan Hyde's daughter, Barbara, has been studying at Katharine Gibbs School, after a year or so of engineering studies. She paid your Secretary the compliment of selecting him for the usual interview included in the school training schedule prior to her graduation next June. There are now at least three daughters in the Boston area, the others being representatives of Penn Brooks and Phil Cristal.

The worthy Dean made an official visit to the Philadelphia area and, in his own words, spoke there as an authority on M.I.T. round figures. Present in the audience were Ralph Ross, still with the Telephone Company; Garland Fulton, with Cramp Shipbuilding Company, and René Pouchain, the cake-maker. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

## 1919

The Class participated in the February graduation festivities in Boston. Thirty-six of our Class were present at the Alumni Banquet on Saturday evening, February 26, when Don Way, our President, formally presented our 25-year gift to the Institute. The following is quoted from Dr. Compton's letter: "I would assure you and your classmates that the administration of the Institute will make every effort to utilize this gift [war bonds] in a manner to justify the loyalty, generosity, and sacrifice of the members of the Class of 1919 which will make it possible. Wishing you every success in your plans for the reunion. . . ."

After the Class Day exercises on February 26 the Class met in the office of George Michelson and Isidor Slotnik to discuss 25-year reunion plans. At another meeting held in New York on the previous Thursday, it had been unanimously decided to have a stag reunion on July 28, 29, and 30 at some central point between Boston and New York, such as the vicinity of New London, Conn. It was suggested that we include the wives in the reunion activities by having a luncheon in Boston and in New York some time during the week preceding the reunion in Connecticut. After the banquet, the Class met again in a room at the Statler and had a chance to visit informally until late. Everyone was well pleased with the excellent turnout of the Class at the banquet and with the fine spirit demonstrated. Your Secretary and Don Way spent a pleasant Sunday in Boston visiting with Don Kitchin, Bill Banks, and Bob Hackett and their families. Bill Banks's offspring were not only capable of winning at ping-pong but also of producing mathematical problems which defied solution.

We understand that Max Untersee gave some of the Class quite a ride returning from the Alumni Banquet. Max also reported receipt of a letter from Paul F. Swasey saying that Paul had leave from the Virginia Electric and Power Company and was in Washington in the utility section, Office of Chief of Engineers, War Department. His daughter, Joanne, is entering Salem College, Winston-Salem, N.C. — Ark Richards informs us that Bob Bolan

is now with the Raytheon Manufacturing Company, Newton, Mass.

The returns from Alumni Fund subscriptions at the end of February showed the Class with 124 contributors out of a quota of 166. We are anxious that more of the Class receive The Review and should appreciate any efforts to stimulate this interest among those who do not at present subscribe. — John P. Putnam, 535 Beacon Street, Boston 15, is "working on a simplified line of aircraft navigational instruments, such as pilotage watch, watch-type dead-reckoning computer, calibrated masking tape flight line for maps, folding protractor, stabilized drift indicator, and so on." — Mrs. C. H. Paulsen, 78 High Street, Hingham, Mass., writes that Commander Paulsen was delighted with his overseas assignment and says, "Shucks, this is a young man's war; that's why they're sending me." Their 20-year-old son is an ensign in naval aviation, a fighter pilot with a Hellcat to fly, on duty in the Pacific.

Marshall Balfour, who is in the States for a few months on leave from his strenuous health work in the Far East for the Rockefeller Foundation, has been very helpful in 25-year reunion activities. I quote from a letter sent him by Howard H. Searles: "My work at Technology is now being applied toward a master in education at Hyannis State Teachers College." He attended the Art Educators convention in New York in February. — Earle E. Richardson called on your Secretary early in March but unfortunately found him out of town. — Eaton Webber is vice-president of Stark Tool Company, Waltham, Mass.

The following is quoted from Mrs. Robert F. Morrison's letter to Fred Given regarding the service of her husband, the late Lieutenant Colonel Morrison, in the artillery branch. "He was responsible for the purchase, production, and inspection of artillery guns, carriages, fire control equipment, recoil mechanisms, and accessories. Of this work, the advisory board of the New York Ordnance District, Army Service Forces, wrote: 'To his position as a branch chief he brought a rare quality of executive leadership, as well as wise counsel, sound judgment, and a thorough knowledge of engineering. His code was one of unselfish service not only to the district but to his country and its people. His contributions in meeting the responsibilities of his work will live in the peace to which he dedicated his life. We shall ever retain the memory of Colonel Morrison as a loyal associate and a devoted soldier of his country.'"

Joseph Elliot Cannell, now handling priority applications, appeals, and so on, with the War Production Board, is located at 128 Pearl Street, Melrose 76, Mass. — Ralph H. Gilbert is with the New York Telephone Company, engaged in appraisal engineering. — Jimmy Reis writes Bal: "I hope that some time in the not too far future I'll be able to return east and renew old M.I.T. acquaintances."

R. R. Lirehiser, an Army colonel, finished his assignment as instructor at the Command and General Staff School, Fort Leavenworth, Kansas, on March 30. His new station is Hampton Roads. He writes: "It was kind of you to acknowledge my contribution to the class memorial. No more

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fitting gift could have been selected. Those who did the job are to be commended." — Your Secretary had dinner with Leo A. Kelley and Karl Rodgers on March 9. We were joined by Fred Given later in the evening, and work on the class biography was carried out.

Al Richards returned from Florida and has seen Hy Selya in connection with a dyestuff problem. Al has been traveling considerably of late and was leaving for Louisville and planned later to attend the American Chemical Society convention in Cleveland. From there he went to Chicago, Minneapolis, and Canada. He expected to be in New York the latter part of April at the meeting of the rubber division of the American Chemical Society.

Tim Shea, who looked into reunion locations in the vicinity of New London, reported his findings. Your Secretary had a nice visit in Boston with Ark Richards, who runs his own company, the Arklay S. Richards Company, 72 Winchester Street, Newton Highlands, Mass., manufacturing thermocouples and accessories. Ark has mailed in a review of the various locations proposed for our reunion in Connecticut. The promises of a very successful reunion July 28 through 30 are excellent. Everybody out! — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

## 1920

It is a pleasure to report that the Class filled two large tables at the Alumni Dinner. Among those present were Norrie Abbott, Ed Burdell, Al Burke, Nell Carpenter, Bud Cofren, Foster Doane, Jim Downey, Herb Federhen, Al Fraser, Al Glassett, Wilford Hooper, Dan Lord, Don Mitsch, Elliott Perkins, Ed Ryer, Bat Thresher, Ernie Whitehead, and your Secretary. Much interest was evidenced in the prospects for the 25th reunion and the preponderant sentiment seemed to be: (1) that we would hold the 25th, come hell or high water; (2) that it should be a stag affair; and (3) that it should be at some point convenient for those living around Boston and around New York, probably in Connecticut. There is ample time for all of us to air our views on the subject, and your Secretary welcomes suggestions and expressions of preference as regards the nature and location of this important event, which will probably take place a year from this coming June, regardless of the time of graduation ceremonies at the Institute.

Although Jim Downey still has his headquarters at 20 North Broadway, White Plains, N.Y., he is in Boston at present doing engineering work for some local manufacturers. I received a most welcome visit recently from Ned Murdough. Ned is still living down East, his address being 10 Goudy Street, South Portland, Maine. He is just as handsome as ever although, like so many of us, the covering is rather sparse on top. Count Capps is with the W. B. Fishburn Cleaners, Inc., 1212 Main Street, Fort Worth, Texas. Herb Dorr is in Ilion, N.Y. at 94 West Street. Don Ferris has moved to 736 Chicago Boulevard, Detroit. Arthur Littlefield has moved from St. Louis to Ar-

lington, Va. Henri Lench has become a resident of Boston's most exclusive and attractive suburb, Winchester, where his address is 3 Indian Hill Road.

I wish we could reproduce the picture, as well as the news item, that appeared in *Kodak*, the magazine of the Eastman Kodak Company, Rochester. The picture was of a very handsome and distinguished executive by the name of Edward S. Farrow, and the news item announced his election as assistant general manager and assistant vice-president of the company. Ed joined the Kodak people in 1921 and has been production manager since 1941.

To add to the long list of impressive military titles we have Commander Melville W. Powers, now at Tampa Shipbuilding Company, Florida; Lieutenant Colonel Charles J. Lawson, at Wright Field, Dayton, Ohio; and Lieutenant Colonel Charles D. Carleton, Fort Leavenworth, Kansas. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

Francis J. Magee, I, a colonel in the Signal Corps, has been assigned as signal officer of the Fourth Service Command with headquarters at Atlanta. He was previously a staff assistant to the chief signal officer in Washington, and in 1940 he was the assistant chief umpire for the first Army maneuvers at Plattsburg. He served overseas in World War I and later attended West Point. Before entering the Army again in 1939, he had been a civil engineer with the Massachusetts Department of Public Works, a supervisor for the New England Telephone and Telegraph Company at Portland, Maine, and an equipment engineer with the American Telephone and Telegraph Company in New York.

Bernard H. Moran, II, a naval lieutenant, was married last November 22 to Alice B. McKinney of Natick, Mass. Barney was a professor of mathematics and physics at Holy Cross before entering the Navy in 1942. — Philip H. Hatch, VI, presented a paper on "Diesel Electric Locomotives" before the transportation group of the New York section of the American Institute of Electrical Engineers on March 9. Phil is assistant mechanical engineer of the New York, New Haven and Hartford Railroad and has been closely associated with the railroad's pioneering in the use and development of Diesel-electric motive power. His talk described various types of these new engines and their first large-scale operation in combined main-line freight and passenger service.

Franklin O. Carroll, XVI, a brigadier general stationed at Wright Field, co-operated in the preparation of an article entitled "New Model German and Japanese Planes Show Progress in Design Detail" in the March issue of *Product Engineering*. Carroll, chief of the experimental engineering section at Wright Field, also supervises the technical data laboratory there.

Alexander D. Harvey, III, has written to Saint that on April 1 he became executive vice-president of the Dorr Company in New York. Dan has been in Neenah, Wis., where he was sales manager of the building insulation division of the Kimberly-Clark Corporation. Previously he had been in charge of machinery sales for the Nash

Engineering Company of South Norwalk, Conn. He is making his home at the University Club in New York until his youngsters finish the school term and the family can move to the Gorham area. Saint also writes that S. M. Silverstein, X, technical director of the Rogers Paper Manufacturing Company, was in Maine recently and saw Joseph M. Lurie, X. Joe has left the W. S. Libbey Company and as technical director of Bonafide Mills, Inc., of Winthrop and Lisbon Falls, Maine, is now engaged in the manufacture of floor coverings and asphalt derivatives. — Howard F. MacMillin, II, President and General Manager of the Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, takes a bow for constructing the largest press ever built for powder metallurgy.

Get your Alumni Fund subscription in early and help keep mailing costs at a minimum. Please enclose a note for these columns in the same envelope. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 591 Broad Street, Newark 2, N.J.

## 1922

Repercussions are still arriving from the Alumni Dinner in the form of suggestions from various members of the Class that we know more about one another's business activities. Notes written to your Secretary will be followed by appropriate action.

Clayton D. Grover, Class Secretary, is on his annual trip to the West Coast as vice-president of the Whitehead Metal Products Company. He will report on contacts in a later issue. — Ferris Briggs, 972 Post Road, Scarsdale, N.Y., receives our congratulations upon the addition to his family of Christopher Briggs on March 7. We performed suitable toasting ceremonies on Alumni Day in Boston.

Frances Hurd Clark has been appointed assistant professor of metallurgy at Stevens Institute of Technology. She is the first woman staff member of professorial rank to receive this honor. She will continue as metallurgist for the Western Union Telegraph Company, having recently served as engineering consultant at the Frankford Arsenal of the United States Army. — Shepard Dudley is reported in *Newsweek* as the president of a new Standard Oil Company corporation to be known as Intava, Inc. Intava will sell gasoline and other petroleum products used in airplane operation at all principal foreign air bases.

It is with sincere regret that we record the death of two members of our Class and extend to their families our most sincere sympathy. Stanley E. Cliff of Winchester died on February 25. He was active in real estate operations until he entered the Army Air Forces in Boston in November, 1942, serving as staff sergeant. Ralph Dudley Carleton, engineering manager of the Louisville plant of the Curtiss-Wright Corporation and designer of many basic airplane patents, died unexpectedly of a cerebral hemorrhage at his home, 4021 Elfin Avenue. He had been with Curtiss-Wright for 21 years, designed the famous Falcon warplane, and invented a device for the application of airplane brakes. He was recognized through-



1922 Continued

out the nation as an authority on many intricate parts of the modern plane.

Our Class President, Albert J. Browning, expressed his disappointment in not being with us on Alumni Day. His present efforts as director of the purchases division, Army Service Forces, are partially described in *Time* for February 28. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. WHITWORTH FERGUSON, *Assistant Secretary*, Ferguson Electric Construction Company, 204 Oak Street, Buffalo, N.Y.

## 1923

The Alumni Day Dinner brought out two full tables, those present including H. B. Golding, E. L. Greenblatt, Frank Haven, Donald W. Height, Ray Holden, George A. Johnson, E. E. Kattwinkel, J. J. Murphy, J. A. Pennypacker, Gerald Putnam, E. C. Rue, H. F. Russell, A. M. Valentine, D. E. Washburn, E. W. Willis, and your Secretary. The Committee of Alumni Hosts contained in addition the names of W. A. Gallup, P. C. Smith, and H. H. Zornig.

By persistent inquiry as to reasons for address changes, your Secretary is able to turn up stories which bring into these notes names not previously recorded here. For example, J. H. Thompson writes from Riverton, N.J.: "I have been with the Public Service Electric and Gas Company in their electric distribution department here in New Jersey since 1926. During most of that period I have been located in Elizabeth, serving in various capacities and becoming on January 1, 1941, district superintendent in the Elizabeth district. In April, 1943, another shift brought me to the southern end of the system, where I am now located as assistant division superintendent in the Camden area. It was quite a proposition for us to pull up our roots after living for 15 years in Elizabeth. However, Bea and the boys (Church who is 16 and Jeff who is 13) were game sports, and here we are, settled in Riverton."

A report from Josiah R. Elliott, Jr., says he is back with the Harrisburg Gas Company in Harrisburg, Pa. On graduation, he says, he was with this company for a brief time, and also with the Sioux City Gas and Electric Company. From these assignments he went with the Connecticut Light and Power Company, and after 12 years there, formed an industrial sales business of his own, which he maintained until January 1, 1943. — Ernest A. Davis writes from Stamford, Conn.: "I am still employed by the Pitney-Bowes Postage Meter Company and am now branch auditor." He further reports that he is a director of the National Association of Cost Accountants and master of his Masonic lodge.

The Boston *Herald* reported in February the election of Sydney S. Dean as a director of the Workingmen's Co-operative Bank of Boston. It says: "Dean, a member of the Norwell rationing board, is assistant treasurer of the New England Mutual Life Insurance Company, and a member of Mayor Tobin's advisory committee to the city of Boston planning board. He has been active in the real estate field since 1925." — Jack Storm, I am sorry to advise, died in New York in January. — E. G. Schoeffel, reports Professor Locke '96, has been in charge of

the Mead reduction plant of the Aluminum Company of America, near Spokane, Wash., since the plant began operating. Now he has been transferred to Pittsburgh to become manager of all reduction plants for Alcoa. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree 84, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

## 1924

Anatole Gruehr reports that on January 27 at the Technology Club the New York group held a luncheon attended by George Arapakis, Ray Hamilton, Ed Jagger, Bill Keplinger, H. H. A. Razzack, Nat Schooler, Ed Wininger, and himself. The main subject of discussion was our 20th reunion, and the following recommendations are submitted for action to all other local groups of the Class: (1) that each local group plan to hold early in June a get-together which would not involve much transportation; (2) that the Class as a whole plan to hold a deferred 20-year reunion as soon after the conclusion of the war in Europe as transportation and other arrangements can be made. For personal news, Anatole reports that Razzack expected to leave for India early in March, to be established in Calcutta as representative of American manufacturers supplying equipment for postwar industrialization of the country. Bill Correal writes from California that he has been seeing Don and Betty Moore and that with Archie Carothers and Rock Hereford they'll have a nucleus from which to organize a reunion of their own.

The first 20-year reunion, inspired by Bill Robinson and Frank Barrett, was held on the afternoon of February 26, preceding the Alumni Banquet. The 25 who gathered to make up in noise what they lacked in numbers were Bill Robinson from Cleveland, George Parker from Schenectady, Bill McCallum from Philadelphia, Henry Zeiger from New York, Cy Duevel from Norwich, Conn., and, from the vicinity of Boston: Frank Warren, Jack Stanton, Alec Bone, George Neitlich, Gordon Joyce, Bob Simonds, Del Kendall, Bud Robertson, John Skinkle, Dwight Marsh, Herb Stewart, Wink Quarles, Andy Kellogg, Harry Goodman, Blay Atherton, Ray Lehrer, Fred Ashworth, Chick Kane, Frank Barrett, and George Knight. Avery Ashdown joined us at the banquet, which was ably organized by Herb Stewart.

"Just two days after our memorable reunion binge," writes Chick Kane, "who should arrive in town but Ike Lee of Dallas, Texas, suh! Ike didn't even know there was an Alumni Dinner (Note: It won't happen again; he is now a Review subscriber.) He had made the long trek north from God's Country with his very charming wife for the commendable purpose of enrolling Ingram, Jr., at the Institute. I got hold of Andy Kellogg, and the three of us had a private reunion of our own. Ike, whom you may remember as being a bit on the willow side as an undergraduate, now looks like a Texas steer." Continues Chick: "You have probably heard that Jimmie Doolittle has gone up one more star to lieutenant general. Maybe '24 will give Tech its first four-star general yet."

Nat Schooler and Anatole Gruehr both sent clippings about the death in line of

duty of Isaac Brimberg, from which these facts are taken: He had risen to be chief engineer for WNYC broadcasting station, after starting as public address operator in 1924. He was chief liaison officer and consultant on radio for police, fire, and other departments. He designed and supervised the installation of the Brooklyn transmitting unit. On May 19, 1942, he enlisted in the signal section of the Army Air Forces, and his death in an accident on the firing range in Mobile, Ala., occurred but nine days after his promotion to the rank of major.

Russ Ambach, by way of correcting an item which appeared in these columns last November, writes: "Paterson, N.J., has been my foxhole for several months. I commute to Springfield, Mass., where my family still lives." Russ is the representative of American Bosch Corporation at Wright Aeronautical Corporation. — Frank Barrett is back in Boston and next year will be regularly featured in 1924 class notes. Subscribe now to the Alumni Fund, so you won't miss them. — FRANCIS A. BARRETT, *General Secretary*, 50 Oliver Street, Boston, Mass. GEORGE W. KNIGHT, *Assistant Secretary*, 36 Arden Road, Watertown 72, Mass.

## 1925

Ladies first! From the column, "Our Gracious Ladies," in the February 2 issue of the Boston *Traveler*, I quote the following paragraphs: "As chairman of the Uptown Branch of British War Relief at 27 Commonwealth Avenue, Mrs. John E. Kennedy [Mary Morrison] of Hereford Street has the job of seeing that a daily average of 150 Royal Navy men are completely equipped with sweaters, scarves, sea-boots, etc. . . . [She] was graduated from M.I.T. where she studied architecture . . . made her social bow in England, where she has many relatives and was presented at court. . . . After studying at the School of Design at Fontainebleau, France, she returned to this country and entered the field of architecture, later shifting to interior decorating which she recently re-entered, and is now affiliated with a large chain of eastern coast hotels supervising the decorations. Mother of two daughters, aged 14 and 10, she recently has been summing in Weston. Last month she was sponsor at the christening of the large destroyer escort, Inman, built for the British at the Boston Navy Yard."

The marriage of Constance Hancox to Geoffrey Roberts occurred September 18 at St. Augustine's Church, Johannesburg, South Africa. Joe Russell and Ruth Crawford were married February 19 at the Riverside Methodist Church, Houston, Texas.

The West Virginia State College announced in December the granting of a leave of absence to James C. Evans, VI, director of trade and education and professor of mechanical industries, in order that he might become assistant civilian aide to the Secretary of War. His special interest will be in the educational training program of the War Department. He was formerly connected with the War Production Board and later was consultant of the War Manpower Commission. Evans, who received his master's degree in 1926, was the recipient that year of the Harmon Award for research in electrical engineering.

1925 Continued

Harry C. Karcher, IX-B, of the General Motors' Allison division at Indianapolis, was joint winner with John Dolza of the 1942 Manly Memorial Medal of the Society of Automotive Engineers. The award, conferred at the S.A.E. national aircraft engineering and production meeting on the West Coast, was the first to be made since 1939. It was presented in recognition of the excellence of a technical paper, "Correlation of Ground and Altitude Performance of Oil Systems," which was presented June 8, 1942, at Detroit by the medalists as co-authors. "Karcher established the first American glider production and organized the American Glider Association. Before resuming engineering work for the Allison division in 1940, he was president and general manager of Packing Paper Products, Inc., of Detroit.

A brief note from Major E. H. Mitcham says: "In hospital — just back from overseas. Best luck to '25." — HOLLIS F. WARE, *General Secretary*, 410 Prospect Street, Wood River, Ill. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

## 1926

Eben Haskell, chairman of the 1926 class endowment fund committee, has had a gratifying response to his last letter requesting annual contributions. As reported in the Institute Treasurer's report dated July 1, our endowment fund totaled \$20,473.70, and as a result of the current contributions being made, we shall add approximately \$600 to this sum. When I say that the results of the 1943 solicitation were particularly gratifying, I should qualify it to the extent that a *small* number of the Class have contributed most *generously*. The fact remains that only about 5 per cent of the Class are contributing, and if we are to make our goal of \$50,000 by our 25th reunion, we must substantially increase the number of annual contributors. From now on we should really average close to \$4,000 a year. If every member of the Class contributed, an annual gift of less than \$10 per person would be required, although of course this ideal unanimity will never be obtained.

Other classes at the Institute have similar funds, the largest being that of 1928 with a total of over \$36,000. Most of the other funds are insurance plans, but we now have ours on the straight basis of an endowment fund held by the Institute and being credited with interest income each year at the rate earned by the entire endowment fund of the Institute.

The Secretary has only address changes in the way of personal news this month. Lieutenant Herbert Creedon, sometime of Cambridge, may now be reached through the Fleet Post Office, San Francisco. John E. Deignan is now a lieutenant colonel in the aviation petroleum branch of the Army Air Forces in Washington. William Goodridge, a lieutenant, is resident inspector of naval material in Newark, N.J. Reports sift in of the important work accomplished in far places by Lieutenant-Colonel Robert E. Mattson. William F. Rivers continues to serve the Standard Vacuum Oil Company in Bombay, India, and we welcome the occasional reports that arrive from him. Herbert J. Kaufmann has been transferred from

Jersey City to Baltimore by the Mutual Chemical Company of America. Herb Beckwith continues on leave of absence from the Institute while he is on duty at Princeton University as executive officer of an important war project. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

## 1927

Eleven members of the Class attended the Alumni Banquet in Boston on February 26. Your Assistant Secretary was among those present and arranged for each one to jot down a short note on his current activities. Thus was much of the following news secured.

Alf K. Berle, as engineer in the research division of the United Shoe Machinery Corporation in Boston, says that they are busy up to their ears on the development and manufacture of war equipment. He has a son, Roger Kort Berle, born in January, 1943, and enjoying life lustily in his home town, Dedham. Maury James is now Major James of the United States Engineers, whose finances he is keeping straight in Washington's Pentagon Building. He now has a son and a daughter. — Arthur J. Connell is located in Boston with E. B. Badger and Sons Company and is kept busy with aviation gasoline and butadiene plant design. — Glenn D. Jackson, Jr., Pawtucket, R.I., says he is "still in the 'rag' business (United States Finishing Company), dyeing, finishing, and printing fabrics. At present, business is about 75 per cent with one customer, Uncle Sam. My only new accomplishment is a daughter, Ann, born last May 28 and at present being properly spoiled by her two older brothers, Glenn and Bob. Incidentally, if your helicopter gives her last gasp at 5,000 feet, telephone me: I am rapidly becoming a Rube Goldberg on parachutes, as most of our fabrics are used as such."

Russell E. McCassey is doing general contracting in Watertown, Mass. — C. H. Peterson is an engineer with Jackson and Moreland and tells us that Gene Geisel and Jim O'Dowd are also with this concern. — Jack Dunn is superintendent of T. W. Cunningham, Inc., airport construction contractors in Boston. — Warren E. Priest of Wellesley Hills is still with Mason-Neilan Regulator Company. — Joseph C. Burley of Milton is vice-president and engineer of Boston Insulated Wire and Cable Company. — Wheaton H. Hutchison is in charge of sales in the fine chemicals division of E. I. du Pont de Nemours and Company, Providence, R.I.

Ezra Stevens says: "At present I am working as diligently as I can to do the Axis the maximum possible harm. Our firm, the Stevens-Arnold Company, is an electrical and electronic manufacturer, and like all others in the field, is carrying a heavy load of war business. After V day our plan is to manufacture specialties for the electrical communications industry. Our efficient Vice-president, Dwight Arnold, carries water on both shoulders and guides the destinies of our company as well as his own." Arnold himself says: "A year ago I became associated with Ezra Stevens in the Stevens-Arnold Company, Inc., manufacturing electrical instruments about which I know nothing. Steve supplies the

know-how and how! I still retain my interest in the Arnold-Copeland Company, Inc., which continues capacity operations on percussion primers for 90-millimeter shells and safety plunger assemblies for incendiary bombs. There is no change in the family situation other than that my older boy is now away at boarding school. I see Lew Baker occasionally when he comes to Boston on work for Bigelow, Kent, Willard and Company, business engineers. He also has his own manufacturing company in New York City making electronic gadgets."

Earl Payne, a lieutenant colonel in the Coast Artillery Corps, is now in California. — Ike Stephenson is now a lieutenant colonel in the Air Service Command with headquarters at Patterson Field, Ohio. — Frederick W. Willcutt is now an Army captain, stationed at Camp Lejeune, New River, N.C.

The following new addresses have been received: Fayette B. Darling, Northern Pacific Railway, Northern Pacific Division Office Building, Fargo, N.D.; Francis L. Ford, 4 Fair Oaks Avenue, Newtonville 60, Mass.; Colonel Frederic E. Glantzberg, 514 Clinton Avenue, Fresno 4, Calif.; Lieutenant Richard E. Harrison, 76 Elm Street, Worcester, Mass.; Kenneth C. Vint, 14 Pinecrest, Childersburg, Ala.; Ernest C. Hinck, Jr., 94 Yantacaw Brook Road, Upper Montclair, N.J.

Will not other members of the Class send in post-card autobiographies like those written at the Alumni Banquet? — JOSEPH S. HARRIS, *General Secretary*, Aviation Department, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N. Y. DWIGHT C. ARNOLD, *Assistant Secretary*, Stevens-Arnold Company, Inc., 22 Elkins Street, South Boston 27, Mass.

## 1928

At this year's record-breaking annual Technology reunion on February 26 at the Hotel Statler, Boston, the following '28 men showed up at our class get-together and for the Saturday night banquet: George Bernat, William Carlisle, Christopher Case, John Chamberlain, George Chatfield, Carl Crocker, James Donovan, Roland Earle, George Francis, Jr., Thurston Hartwell, Ralph Jope, William Kirk, Franklin McDermott, John Melcher, and David Olken. — Another group of three classmates — Carl Bernhardt, R. E. Crawford, and George Palo — attended the January meeting of the American Society of Civil Engineers in New York.

This month the usually sparse mailbag includes a very interesting letter from Dick Roth, who at the time of writing (March 2) was somewhere in the South Pacific. Here is his letter: "I've been in the Seabees since September of 1942, becoming executive officer of my battalion in October of that year, and have been with it ever since. Last October I was promoted from lieutenant to lieutenant commander and more recently fell heir to the commandship of the battalion. We left the States in December of 1942, and after doing some road and hospital construction were dumped on the beach up forward. As it worked out, Tojo did us little harm, and through rain and mud and K rations we built two air strips, numerous roads through both jungle and



1928 Continued

coconut plantation, a large dock and supply dump area, warehouses, housing, and anything else they could think of. . . . Had it not been for the month's rehabilitation trip to New Zealand, we should probably have been natives by now! At the moment we are doing maintenance work and standing by for orders to move up north. Having been away from home for 15 months, we are hoping this will be our last job and that we shall not have to miss a third Christmas by being on this side of the world. . . . At the moment, chances look pretty good for snow and a Christmas tree at home.

"I have run across a great many Tech men in both the Army and the Navy; I haven't found a Marine from M.I.T. as yet but suppose there must be some. . . . The work we have been doing has been for the most part interesting — at times exciting — but after months and months on the same small island, things get dull. . . . In spite of the 200-odd bombings we had, we suffered very few casualties — more fox-hole 'wounds' than anything else other than malaria. . . . It was swell finally receiving a copy of *The Review* again; I hope it will keep getting through to me. It would be nice to have the March issue in March — which would mean home, and I could use a bit of that even after our all-out in New Zealand. I'm not interested in waiting for my son to come out and relieve me!" — Dick Roth would appreciate hearing from anyone in the Class. He has a fleet post office address out of San Francisco.

On January 26, Pan American announced that John Leslie had been awarded a 15-years' service pin by Pan American's President, Juan T. Trippe, in a ceremony at the Cloud Club in the Chrysler Building, New York. The following paragraphs are quoted from this announcement: "John C. Leslie, manager of the Atlantic division of the Pan American World Airways System, completed 15 years of service with the company on January 21. Mr. Leslie joined the company as assistant to its chief engineer, André A. Priester. Since then he has served in many capacities. He helped to organize the Transpacific division, which pioneered airways from the United States to Australasia and the Orient. He was engineer, then operations manager, of Transpacific, becoming manager of the Atlantic division, based at LaGuardia Field, New York, in January, 1941. As Atlantic division manager, Mr. Leslie was technical adviser in charge of the historic flight of President Roosevelt to Africa from the Casablanca conference." — GEORGE I. CHATFIELD, *General Secretary*, 6 Alben Street, Winchester, Mass.

## 1930

From Corvallis, Ore., comes word of the arrival of their first child to Lou and Mrs. Verveer. Lou is in officer candidate school and writes that he hopes Philip will become a member of the Class of 1965 at the Institute. — Ten classmates attended the Alumni Day Dinner at the Statler in February. I didn't call it the Stein-on-the-Table Dinner because the 1930 table was one of those that didn't have any steins. Course II was represented by Elmer Bjurling, Jack Guinan, and Jack Latham; VI-A by Scotty and Myron Smith; and X by G. L. Cox, Tony Savina, and Al Vint. Enoch Greene,

XII, and your Secretary completed the group. Cox, a lieutenant colonel, has been stationed at the Watertown Arsenal, and all the others are engaged in war work in a number of representative industries.

Perhaps it is not too early to mention that 1945 is the date for our 15-year reunion. To hold or not to hold will probably be the question. So your Secretary will welcome any and all comments pertaining to the reunion, together with news of your own activities and those of other members of our Class. — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass.

## 1931

Two promotions were recently announced by the Army Ordnance in Boston: William F. Robinson has been advanced from the rank of captain to major; and Francis C. Crotty, from that of major to lieutenant colonel. Bill is chief of the property branch of the Boston Ordnance District and is living in Methuen. Crotty is stationed at the Army Ordnance Arsenal at Watertown. Prior to being called to active duty at Watertown Arsenal as a first lieutenant in October of 1940, Lieutenant Colonel Crotty was supervisor of vocational guidance and a teacher for the Somerville school department. At first assigned to the arsenal's production department, in charge of the apprentice school, where he directed the training of several thousands for employment in the arsenal, he was appointed in April, 1943, to the position of industrial relations officer for the arsenal, which position he now holds. In this capacity, he heads the arsenal's newly formed industrial relations department. Crotty and his wife, the former Phyllis Radigan of Somerville, now reside in Newton.

At the Naval Air Station chapel in Pensacola, Fla., on November 27, Emma Jane Hodgson of Wilmington, Del., became the bride of Smedley D. Butler, Jr., a lieutenant in the United States Marine Corps Reserve. — Robert Kay Wilson and his wife announce the birth of their first child, a boy, Robert Kay Wilson, Jr., on January 21. As a lieutenant in the Air Forces, Bob has been stationed in Texas for more than a year and according to a card received at Christmas-time, is at the Midland Army Air Field, Midland, Texas. He said that he was flying about six hours a day but couldn't seem to get out of Texas.

David B. Ericson has taken a position with the Florida state geological survey to assist in work connected with exploration for oil in Florida. Ericson has served as instructor in geology at Ohio State University. He has also been employed by oil companies in California and Texas and spent two years in Turkey in oil exploration work for the bureau of mines of the Turkish Government. — W. R. Toole, IX-B, is employed as field engineer with the California Arabian Standard Oil Company in Arabia.

The February issue of *Pencil Points* carried the following sketch of the career of George A. Sanderson, who in February joined its staff: . . . "The editorial staff of *Pencil Points* will have an important and welcome addition in the person of George A. Sanderson, architect by training, journalist by choice, and general good companion by disposition. . . . George is eminently fitted

by training and experience to work effectively in this field. He came to MIT in 1928 clutching an A.B. degree from Yale and emerged three years later with a B.S. in architecture. After some additional study at Harvard and a period of travel in England, France, and Italy, he returned to acquire professional experience working for architects in such widely separated places as Boston and Beverly Hills, California. He even ventured to do some architecture on his own. In 1933 he looked long and hard at the Depression and wisely transferred what he modestly calls 'his talents, if any' to the press as a member of the staff of *Newsweek*. . . .

"He did not, however, succeed in breaking off with his first love, which was architecture, and in 1937 took the first step toward becoming an architectural editor by moving over to Sweet's Catalog where he remained for about a year. In 1938 he heeded the call of California and went to San Francisco as building editor of *Sunset*, a home magazine with an extensive local circulation. Here he enjoyed approximately two years of hectic action. He paid housewives \$1. each for published bright ideas; wrote a booklet on outdoor fireplaces, complete with prefabricated recipes; edited his architectural pages; published houses by most of the West Coast architects, who found his magazine a splendid fishing ground for clients. The outdoor fireplace book was written as a part of his job, a fact which George mildly regrets since it is now in its umpteenth edition and still sells.

"In 1940 George came back to New York as an associate editor of *Architectural Record*. He had imbibed some of the heady liberalism characteristic of West Coast architects, and wanted to edit for them and their brethren throughout the country. Until the summer of 1942 he remained what he had started out, in 1937, to be: an architectural editor.

"But World War II and other reasons led him to resign to take a job with the Office of War Information, where he could do his share toward winning the war. He served with the Bureau of Publications and Graphics, Domestic Branch, OWI; and later became Assistant Chief, Bureau of News and Features, Foreign Branch. Now . . . he comes to *Pencil Points*, and, as we said, we are exceedingly happy to have him with us. We have a suspicion that some of the ideas which constantly bubble up within him will cause us work — but it will be pleasant work, and useful."

Since May 1, your Secretary has had a new home address and hopes that some of you will use it to provide ammunition for these columns. — BENJAMIN W. STEVERMAN, *General Secretary*, 11 Orient Street, Winchester, Mass.

## 1934

The following portion of a letter from Bob C. Becker to Professor Locke '96 will be of interest to every one of us. Bob has been right up in the front lines dishing it out, and it looks as though he can take it too: ". . . I have been in a hospital now for almost two months; it came about through a German machine gunner's popping away at me on the night of January 6 as we rushed just another of the many hills we've taken from the enemy here in the mountains of

1934 Continued

Italy. I was lucky at that, and out of a long burst I got but one slug in my left thumb, although ricocheting lead also caught me in the right elbow and right knee. The thumb was amputated next day at an evacuation hospital, and I joined the ranks of those thousands who never wanted, but got, the Purple Heart anyway. Although I didn't lead the action, I did stay to see my men successfully take that hill, before starting on a 10-mile march up and down mountains to a clearing station. Since then two of my men have been awarded Silver Stars for their deeds that night. In another week or two I'll be back with those boys again for another crack at Jerry. . . ."

The Alumni Day banquet brought forth a number of our brethren for a jovial get-together. Those present at the '34 table included Johnny Hrones, Fran Jenkins, Hank Backenstoss, Johnny Hawkins, Henry Mazer, L. Nieto-Casas, Frank Baxter, Jean Raymond, Ed Nowell, Chuck Kearney, Ken Ryder, Carl Wilson, and your Secretary. Steins and circumstances did not permit the cross-examination of everyone to find his case history and his *status quo*, but we did glean a little low-down.

Frank Baxter is running the machine division of the American Optical Company at Southbridge, Mass. He has just bought a home near by and is in the throes of remodeling. — Carl Wilson is still head of the standard department at American Optical Company. — Chuck Kearney is plant engineer at the Peter Bent Brigham Hospital in Boston, and from what we have heard of his work, it takes a pretty versatile engineer to handle the job. — Jean Raymond is president and owner of Raymond Hardware, Ltd., in Montreal, Quebec. He has built the business up into a sizable enterprise, and while he was in Boston was looking around for additional lines to add to the business. Jean tells us that Claude Beaubien is personnel director of the Arvida plant of the Aluminum Company of Canada. As that plant employs between 15,000 and 20,000 men, we presume Claude has his hands full. Both Claude and Jean have two youngsters.

Well, we will see you next month, "when good fellows get together, with a stein on the table and a good song ringing clear." — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, First Special Service Force, care of Postmaster, New York, N.Y.

## 1937

A very interesting item of news to all of us is that Kenneth W. Winsor is second pilot on the huge 37½-ton flying boat *Mars*. It has the space of a 15-room house, and on a recent 4,375-mile trip, it averaged 160 miles an hour. Lieutenant Winsor married Mary C. Bowditch '40, and they have a 14 months' old daughter. Winsor served four years with the Navy and was recalled to duty shortly before Pearl Harbor. — Word has been received of the death of Milton Freedson on September 10.

The engagement of Van Buren Hansford and Jane Harris was announced at Christmastime. Hansford, an ensign, is stationed in Buffalo. Robert L. Alder and Obara Lee McGlothlin were married in February. Alder is field engineer with the Lane-Wells Company in Los Angeles, where the couple

will make their home. Albert A. Haskell, Jr., and Nancy Schwarz are engaged, as are Gilbert E. Moos and Ruth Feintheil of Cincinnati. Moos is research chemist with the plastics division, Celanese Corporation of America in Newark, N.J. The wedding is tentatively set for June. The engagement of Paul W. Stevens and Elizabeth Gray was announced in February.

John G. Booton, Jr., and Catherine Kage were married in January. They are making their home in Troy, N.Y., where Jack is with the Cluett Peabody Company. He wrote me recently telling me the news and added that Fred Claffee is doing well with Remington and lived near Jack in Bridgeport. Bill Titherington married Jack's sister in 1941 and is the proud papa of William, Jr. The last paragraph which I will quote is for us all: "How about promoting more news from the boys? They aren't very communicative, I guess." So now let's really receive some word which we can print in *The Review*.

Word has been received from Ensign and Mrs. Stanley D. Zemansky of the arrival of Gilbert Marek Zemansky on February 15. Eric and Mrs. Swenson sent out notices advising of the arrival of a baby girl on November 14. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. PHILIP H. PETERS, *Assistant Secretary*, 159 Glen Road, Wellesley Farms 82, Mass.

## 1940

After graduation, Bob Nedell worked as a structural engineer with the Pittsburgh-Des Moines Steel Company until August, 1941, when he was called to active duty with the Seventh Service Command as a construction quartermaster. While attending a training course in Omaha, Neb., he saw Paul Jensen (at that time an Army lieutenant) several times. Later Bob was transferred to Jefferson Barracks in Missouri, where he was assistant post engineer. In June, 1942, Bob was transferred to La Junta Army Air Field in Colorado as post engineer; and fairly recently he has been at Ainsworth, Neb., acting in the same capacity. Bob is a captain now and really enjoys his work, which he says is giving him a chance to use a little civil, electrical, and mechanical engineering.

M. L. E. Bahner is managing a textile mill in Buenos Aires. He speaks of the monthly meetings of the M.I.T. Club, saying there are many Technology men in that country at the present time. — Karl L. Feters, formerly assistant professor in the metallurgical department of Carnegie Institute of Technology, has become associated with the Youngstown Sheet and Tube Company as special metallurgical engineer. His present function is assistant to the operating Vice-president on metallurgical and special operating problems. — When we last heard from him Thomas P. Bowman, a captain in the Army Air Forces, was located at Paine Field, Everett, Wash. He has been walking off with the .30-caliber carbine and a .45-caliber sub-machine-gun medals, so we hear. — Harlan H. Davis, who has been with the International Harvester Company and the Chicago Ordnance District of the War Department, is now a field engineer for the propeller division of Remington Rand, Inc., Johnston City, N.Y.

I have a list of marriages but very little other news for the Class. Please send me a note about yourself so that I may pass it on as news for the next Review. T. E. Sullivan and Jane Marie Brennan expect to be married early this spring. Eileen Virginia Mitchell was married in January to Marshall W. Roberts, an ensign. Manette Lansing Hollingsworth and R. Dixon Speas are planning a spring wedding. Jacqueline Van Bergh and Walter C. Kahn, Jr., were married January 30. Ruth Louise Stevens and Henry Brewer, Jr., were married in February. Jane Stanley's engagement to Judson Mead was announced toward the end of last year. — H. GARRETT WRIGHT, *General Secretary*, 1040 Lombard Street, San Francisco 9, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Apartment 436, 2032 Belmont Road, Northwest, Washington, D.C. JOHN L. DANFORTH, *Acting Assistant Secretary*, Room 24-222, M.I.T., Cambridge 39, Mass.

## 1941

The newspapers record a major part of the '41 events. News of Elizabeth Massey's engagement to John Ballinger, a lieutenant commander, came to us through the newspaper. Ballinger was among the United States Naval Academy class of 1937 men who attended the Graduate School of Naval Architecture and Marine Engineering at the Institute. — Betty Ann Bryson was married in Garden City, Long Island, on January 29 to Ray Foster, a captain in the New York Ordnance District. — Carl Mueller, a captain in the Army Air Forces, was the best man, indeed. — We hear of the engagement of Mary McKee to Frank Englehart. Frank attended the Institute, as well as Georgia Tech and New Mexico Military Institute. — At last report Eleanor Fritz and John Horner had set February 19 as their wedding date. — Louise Van Dermark and Alan Cunningham, a lieutenant in the Army Air Forces, announced their engagement a short while ago in Orange, N.J. — An international affair seems to be in the making in the engagement of Phoebe R. Dartnall of the Women's Royal Naval Service, now stationed at Roosevelt Field, Long Island, to Dave Kenyon. Dave was graduated from Princeton in 1935 before attending the Institute. — Henry Faul took as his bride, Dorothy Walkley, Jackson '41. Henry achieved his master's degree in geophysics at Michigan State College the year after graduation from the Institute and is now doing geological work in Cortez, Colo. — Shirley Lehrer and Ed Wienberger have announced serious intentions along marital lines. Ed is at the University of Pittsburgh working for his master's degree.

A neatly engraved card announces the arrival of Susan Stephanie, daughter of Irv Koss, now stationed at Fort Monmouth as a captain in the Signal Corps. Alice Gott, on the other hand, sets a wonderful precedent in writing for Les about their youngster. The excuse of the man of the house being too busy to write is definitely discounted when there is a Mrs., or potential Mrs., around. We've heard from Pat Woodbury Schwindler and Edythe Baum on several occasions with a great deal of news enclosed. Alice tells of the arrival of Richard Reed Gott, Ricky for short, on the 19th of December and in commenting on their



1941 Continued

pride and joy says, "I do wish you could view Les acting the part of attentive father." She also asks, "Did you know that John Bone was in the Marine Corps? He went to Parris Island on the 13th of October, leaving Boston in a party of 13 on track 13. I hope it is his lucky number. At present he is chasing electrons around at Wright Junior College in Chicago, where he will stay for a short time. After that he is to have a period of primary school for three months, followed by six months of secondary school."

The last letter from Butch Berman was written on December 4 from Italy. His unit is one of the oldest in that theater of war. He says he's waiting to get home and get married, but he doesn't know to whom yet. — A Christmas card from Ian MacLeod reveals that he has moved from his island in the Pacific. — We haven't heard from Bob Alfred in ages; last year we wrote frequently, but it seems that the majority of the letters didn't get to him. He moved around Africa so much that the mail must have got lost in the shuffle.

Your Secretary has received a copy of a letter from Mr. and Mrs. Lewis R. Ferguson, parents of Jim Ferguson, who was killed recently in a plane crash in southern California, not in Pensacola as we reported last month. It is reproduced in its entirety, because we feel that all of you who knew Jim want to know more of his activities after he left school on that June day so long ago in 1941: "It is our sad duty to inform you of the death of our son, who was killed instantly on January 5 near the Salton Sea in southern California, while on routine dive-bomb practice with his squadron. Military services and burial were held on January 15 at Crawfordsville, Ind. Jim was a member of the class of 1939 at Rice Institute, Houston, Texas. He became greatly interested in metallurgy and went to M.I.T. for the summer session to line up his work for that course. After graduation he was employed by the Crucible Steel Company of New Jersey. In April, 1942, he returned to M.I.T. to do research in steel alloys for the government. Priorities made it impossible to speed this work as he wished. He felt the need of action in a great cause and enlisted as a naval aviation cadet in May, 1942.

"He was called for duty on July 12, 1942, reporting to Squantum Naval Base. In October he was transferred to Pensacola, receiving his gold wings and commission as a marine aviator in April, 1943. He was reassigned to Pensacola for a four months' course in aerial photography. Completing this course in September last, he was assigned to San Diego for combat training. Later he was sent to El Toro, Santa Ana, for a wide variety of aviation practice to complete his 18 months of training for overseas duty. Nothing definite is known as to the cause of the accident. As 'the flaps failed to open to check the speed,' the plane did not come out of the dive but hit the target full force. The plane was demolished. His death brings home to us the sad plight of this country, which is losing thousands of its highly educated men, who should have lived on 50 years to serve the nation. We shall always be grateful for his integrity, his achievements at the Institute, and for his happy youth." — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester 21, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, 136 Beacon Street, Boston 16, Mass.

## 1942

Some sort of warning should perhaps have been given that your Secretary was soon to leave Roswell buried in New Mexican dust and thoroughly enjoy himself on an irresponsible leave. He saw the venerable village of Golf and was well conveyed through the more enlightening features of New York City, meeting Jim Thornton '41, XV, for a brief minute at the Commodore. Jim is still a captain in the "ack-ack." He also saw Jack Loveland and Mrs. Loveland-to-be (or is, by now) at Nick's in Greenwich Village. Jack still manages to exist in New Jersey, doing pilot-plant work for Standard Oil of New Jersey. Dave Christison is also over in Jersey doing like work for Socony-Vacuum. Bill Denhard (still working for Sperry?) is seen in the same vicinity now and then. Johnny Arnold, it seems, is somewhere in the wilds of California keeping Pratt and Whitney on its toes. Rumor has it that ye olde red-topped Wolf Altekruze is doing aircraft work out there, too.

Bob Fay, a lieutenant in an Army anti-aircraft battalion, came through to save the class notes with a word via V mail: "I have just finished reading my December Review and want to add a very few notes of people I've seen, censorship permitting. Early in December I ran into Paul Crandall, a lieutenant in Engineers, on the spot testing water for a water supply battalion. Somewhat later I saw Harry Helm, who is doing a bang-up job as lieutenant with an anti-aircraft gun battalion. Harry is a little ahead of me on theory and in practice, and is up toward the front. In fact he's on the beach head. We'll give him a good run for his money, though. Robert Vyverberg, at last reports in October, was a lieutenant, junior grade, in a sub in the Pacific and liking it very much, especially the hotel life between trips. Wendy Phillips, as of January 22, was still designing and testing radio receivers and transmitters for a Newark concern. Reece Wengenroth, a lieutenant in an engineer battalion, had an eight-day leave in London over the Christmas holidays. He reports all well and chipper after a busy time in Africa and Sicily. That's all, then. In Italy I see very few classmates any longer. It seems as if every officer I'm working with is a Tech man but never a classmate. All our classmates seem to be concerned with detection instruments, though peculiarly. I hope censorship will some day permit a full story of Technology's contribution. I'm beginning to appreciate it immensely. I am now back in school again after only a short layoff from studying and instructing in Oran."

What your Secretary afiel is up to and where he will be next are as much of a mystery to him as to everyone else. We're hoping to get our planes and crews shortly, and whether bombing or navigating, it won't be too long from now when the Air Forces will attempt to make use of this exorbitant investment. Here's hoping to see some of you lads over there and letters from one and all by the carload. — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. KARL E. WENK, JR., *Assistant Secretary*, 228 Marlborough Street, Boston 16, Mass.

## 1944

After three years of struggling with selective service, a tough addition to any curriculum, the Class has finally emerged anything but unscathed after "four long

years" at Technology, and is now listed among the Alumni. Inauguration of this column marks the final step in the transition of the Class as a whole from students to Alumni; unfortunately, a large part of the Class is not yet graduated. Much has happened since our happy freshman days (daze?) back in 1940, when almost 400 members of the Class went to Lake Massapoag for an introduction to the Institute: Freshman ties, dormitory errands, field day, hell week, even the dean's list for some — and with a minimum of effort, most became sophomores. The first setback as upperclassmen came on field day. Then came December 7, 1941, and the Class was off on the road to uncertainty — a long road with no end in sight. Finally, after a summer on the Charles, graduation took place three months early, and 200 of the more fortunate of the original 600 came through with those degrees.

Although for one reason or another the members of our Class had tended to become unusually separated while still undergraduates, fairly close contact was still maintained. Now that all have left the Institute, it will become increasingly difficult to keep in touch with old friends. It is the purpose of this column to keep us informed as thoroughly as possible about the doings of all the members of the Class. Please help out by writing to either of your Secretaries and letting them in on the good news about you and your friends in the Class, so that they can pass the word along.

The Class will have very high representation among the officers (and gentlemen) of the Army by midsummer if all the boys now at officer candidate schools are successful. About 200 are there now, either at Belvoir, Aberdeen, Edgewood Arsenal, Monmouth, Camp Davis, or Fort Benning. When the Army Specialized Training unit left the Institute at the end of March, the final contingent of the Reserve Officers' Training Corps was also on its way, with Fred Blatz, Ed Cumpston, Tom Flannery, Warren Howard, and Leland Stanley headed for Belvoir, and Bob Breck, Bob Cummings, Bob Dew, Johnny Feroli, Tom Lawson, Al Lichten, Sammy Losco, Tom Morgan, Court Reeves, Jim Ruoff, George Saulnier, and Craig Williams among those going to Fort Benning. We understand that the V-12 graduates, also, have now all been assigned to their midshipman schools. At Belvoir, in addition to those starting April 1, there are 45 men from Technology at Engineers' Officer Candidate School, distributed among three different classes which will be graduated at two-week intervals.

Matrimony is on the minds of many members of the Class. Herb Carpenter was married before graduation to Jessica Howell, with John Goldey as best man. Others engaged before graduation include Caleb Taft to Cuyler Mathews and Al Martin to Virginia Bruce. Hamilton Herman '43, a Course XVI man now working in California, is engaged to Martha Schueler; and Bill Boyle intends to marry Nancy Jacobs, a Wellesley sophomore. Kelly Damsgaard was planning to be married before graduation. Congratulations, guys. Congratulations also to a fellow Secretary, Clint Kemp '43, whose engagement to Olive Williams, a Wellesley junior, was recently announced. — WILLIAM B. SCOTT, *General Secretary*, Officer Candidate School, Fort Belvoir, Va. JAMES E. GALLIVAN, JR., *Assistant Secretary*, 430 Adams Street, Dorchester 22, Mass.



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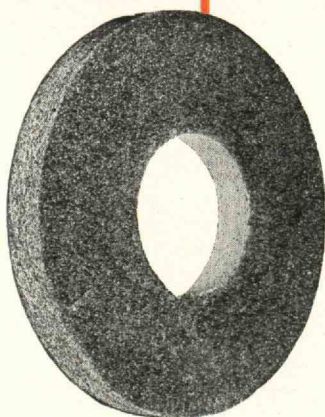
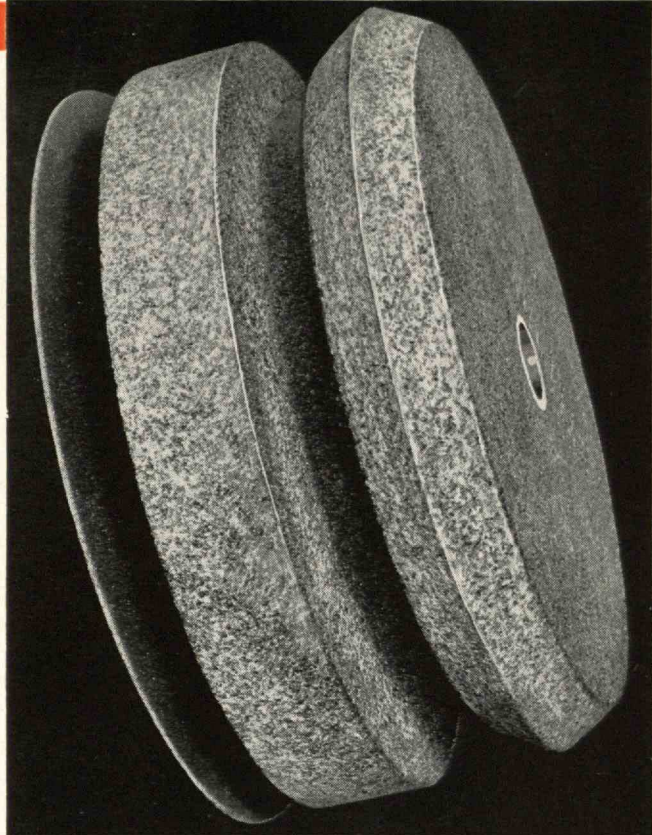
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